

CETIFICATION

SDG No:

MC49129

Humacao, PR

Laboratory:

Accutest, Massachusetts

Site:

BMS, Building 5 Area, PR

Matrix:

Groundwater

SUMMARY:

Groundwater samples (Table 1) were collected on the BMSMC facility - Building 5 Area. The BMSMC facility is located in Humacao, PR. Samples were collected December 08 -12, 2016 and were analyzed in Accutest Laboratory of Marlborough, Massachusetts that reported the data under SDG No.: MC49129. Results were validated using the following quality control criteria of the methods employed (MADEP VPH and MAPED EPH, Massachusets Department of Environmental Protection, 2004) and the latest validation guidelines (July, 2015) of the EPA Hazardous Waste Support Section. The analyses performed are shown in Table 1. Individual data review worksheets are enclosed for each target analyte group. The data sample organic data samples summary form shows for analytes results that were qualified.

In summary the results are valid and can be used for decision taking purposes.

Table 1. Samples analyzed and analysis performed

SAMPLE ID	SAMPLE	MATRIX	ANALYSIS PERFORMED
SAIVIPEE ID	DESCRIPTION	IVIATAIA	ANALISIS PERFORIVIED
14040120 1		6	V L C TRUCK
MC49129-1	A-2R2	Groundwater	Volatiles TPHC Ranges
			Extractable TPHC Ranges
MC49129-2	A-1R4	Groundwater	Volatiles TPHC Ranges
			Extractable TPHC Ranges
MC49129-3	FB120816	Field Blank Water	Volatiles TPHC Ranges
			Extractable TPHC Ranges
MC49129-4	S-34	Groundwater	Volatiles TPHC Ranges
_			Extractable TPHC Ranges
MC49129-5	S-33	Groundwater	Volatiles TPHC Ranges
			Extractable TPHC Ranges
MC49129-6	EB120916	AQ – Equipment Blank	Volatiles TPHC Ranges
·			Extractable TPHC Ranges
MC49129-7	S-37	Groundwater	Volatiles TPHC Ranges
			Extractable TPHC Ranges
MC49129-8	S-35	Groundwater	Volatiles TPHC Ranges
			Extractable TPHC Ranges
MC49129-9	FB120916	Field Blank Water	Volatiles TPHC Ranges
			Extractable TPHC Ranges
MC49129-10	S-35	Groundwater	Volatiles TPHC Ranges
			Extractable TPHC Ranges
MC49129-11	S-35D	Groundwater	Volatiles TPHC Ranges
			Extractable TPHC Ranges

SAMPLE ID	SAMPLE DESCRIPTION	MATRIX	ANALYSIS PERFORMED
MC49129-12	S-39D	Groundwater	Volatiles TPHC Ranges Extractable TPHC Ranges
MC49129-12D	S-39D MSD	Groundwater	Volatiles TPHC Ranges Extractable TPHC Ranges
MC49129-12S	S-39D MS	Groundwater	Volatiles TPHC Ranges Extractable TPHC Ranges
MC49129-13	S-39S	Groundwater	Volatiles TPHC Ranges Extractable TPHC Ranges
MC49129-14	EB121216	Equipment Blank	Volatiles TPHC Ranges Extractable TPHC Ranges
MC49129-15	S-28	Groundwater	Volatiles TPHC Ranges Extractable TPHC Ranges
MC49129-16	S-32	Groundwater	Volatiles TPHC Ranges Extractable TPHC Ranges
MC49129-17	FB121216	Field Blank Water	Volatiles TPHC Ranges Extractable TPHC Ranges

Reviewer Name:

Rafael Infante

Chemist License 1888

Signature:

Date:

January 22, 2017

Report of Analysis

Page 1 of 1

Client Sample ID: A-2R2

Lab Sample ID:

MC49129-1

Matrix: Method: AQ - Ground Water

DF

1

MADEP VPH REV 1.1

Date Sampled: 12/08/16

Date Received: 12/14/16

Percent Solids: n/a

Project:

BMSMC, Building 5 Area, Puerto Rico

Run #1

File ID BH40886.D Analyzed 12/15/16

Ву AF

RL

50

50

50

50

50

Run#2

Prep Date n/a

MDL

8.8

8.0

9.7

8.8

8.0

Units

ug/l

ug/l

ug/l

ug/l

ug/l

Prep Batch n/a

Q

J

J

Analytical Batch

GBH2442

Run #2

Purge Volume

Run #1

5.0 ml

Run #2

CAS No.

Volatile TPHC Ranges

CAS No. Compound

C5- C8 Aliphatics (Unadj.) C9- C12 Aliphatics (Unadj.) C9- C10 Aromatics (Unadj.) C5- C8 Aliphatics

2,3,4-Trifluorotoluene

C9- C12 Aliphatics

Surrogate Recoveries 2.3.4-Trifluorotoluene

101% 93%

Run#1

Result

32.2

647

14.2

ND

40.1

Limits

70-130% 70-130% itael Infant Méndez 10 # 1881

ND = Not detected

MDL = Method Detection Limit

RL = Reporting Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank N = Indicates presumptive evidence of a compound



Report of Analysis

Page 1 of 1

Client Sample ID: A-2R2 Lab Sample ID:

MC49129-1

Matrix: Method:

Project:

AQ - Ground Water

MADEP EPH REV 1.1 SW846 3510C

BMSMC, Building 5 Area, Puerto Rico

Date Sampled: 12/08/16

Q

J J

J

Date Received: 12/14/16

Percent Solids: n/a

File ID DF Analyzed By Prep Date Prep Batch **Analytical Batch** OP49312 **GDE922** Run #1 DE16511.D 1 12/27/16 TA 12/22/16

Run #2

Run #1 Run #2 Initial Volume Final Volume 940 ml

2.0 ml

Extractable TPHC Ranges

CAS No.	Compound	Result	RL	MDL	Units
	C11-C22 Aromatics (Unadj.)	79.6	110	30	ug/l
	C9-C18 Aliphatics	18.4	110	18	ug/l
	C19-C36 Aliphatics	ND	110	29	ug/l
	C11-C22 Aromatics	78.9	110	30	ug/l
CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Lim	its
84-15-1	o-Terphenyl	69%		40-1	40%
321-60-8	2-Fluorobiphenyl	71%		40-1	40%
3386-33-2	1-Chlorooctadecane	46%		40-1	40%
580-13-2	2-Bromonaphthalene	74%		40-1	40%



ND = Not detected

MDL = Method Detection Limit

RL = Reporting Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

 $B = Indicates \ analyte \ found \ in \ associated \ method \ blank$

Report of Analysis

Page 1 of 1

Client Sample ID: A-1R4 Lab Sample ID:

MC49129-2

Matrix: Method: AO - Ground Water

MADEP VPH REV 1.1 BMSMC, Building 5 Area, Puerto Rico Date Sampled: 12/08/16

Date Received: 12/14/16

Percent Solids: n/a

Run #1

Project:

File ID BH40887.D DF Analyzed 12/15/16 1

By AF Prep Date n/a

MDL

8.8

8.0

9.7

8.8

8.0

Units

ug/l

ug/l

ug/l

ug/l

ug/l

Prep Batch n/a

Q

Analytical Batch

GBH2442

Run #2

Purge Volume

Run #1

5.0 ml

Run #2

Volatile TPHC Ranges

CAS No. Compound C5- C8 Aliphatics (Unadj.)

> C9- C12 Aliphatics (Unadj.) C9- C10 Aromatics (Unadj.) C5- C8 Aliphatics

C9- C12 Aliphatics CAS No. Surrogate Recoveries

> 2,3,4-Trifluorotoluene 2,3,4-Trifluorotoluene

Run#1

Result

583

641

58.7

578

70.0

97%

89%

Run#2

RL

50

50

50

50

50

Limits

70-130% 70-130%



ND = Not detected

MDL = Method Detection Limit

RL = Reporting Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank

Project:

SGS Accutest LabLink@170707 09:11 29-Dec-2016

Report of Analysis

Page 1 of 1

Client Sample ID: A-1R4 Lab Sample ID: MC49129-2

Matrix: AQ - Ground Water Method: MADEP EPH REV

MADEP EPH REV 1.1 SW846 3510C BMSMC, Building 5 Area, Puerto Rico Date Sampled: 12/08/16
Date Received: 12/14/16

Percent Solids: n/a

File ID Prep Batch **Analytical Batch** DF Analyzed By Prep Date **GDE922** Run #1 DE16512.D 1 12/27/16 TA 12/22/16 OP49312 Run #2 a OP49312 **GDE923** DE16533.D I 12/28/16 TA 12/22/16

	Initial Volume	Final Volume
Run #1	920 ml	2.0 ml
Run #2	920 ml	2 (1 ml

Extractable TPHC Ranges

CAS No.	Compound	Result	RL	MDL	Units	Q
	C11-C22 Aromatics (Unadj.) C9-C18 Aliphatics C19-C36 Aliphatics C11-C22 Aromatics	ND ND ND ND	110 110 110 110	31 18 29 31	ug/l ug/l ug/l ug/l	
CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limi	ts	
84-15-1 321-60-8 3386-33-2 580-13-2	o-Terphenyl 2-Fluorobiphenyl 1-Chlorooctadecane 2-Bromonaphthalene	43% 70% 30% ^b 72%	42% 70% 27% ^b 71%	40-14 40-14 40-14	10% 10%	

(a) Confirmation run.

(b) Outside control limits due to possible matrix interference. Confirmed by refractionation/reanalysis.



ND = Not detected

MDL = Method Detection Limit

RL = Reporting Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank

N = Indicates presumptive evidence of a compound

Report of Analysis

By

AF

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Client Sample ID: Lab Sample ID:

FB120816 MC49129-3

Matrix:

AQ - Field Blank Water

DF

MADEP VPH REV 1.1

Date Sampled: 12/08/16 Date Received: 12/14/16

Percent Solids: n/a

Q

Method: Project:

BMSMC, Building 5 Area, Puerto Rico

Analyzed

12/15/16

Prep Batch

Prep Date

n/a

Analytical Batch GBH2442

Run #1 Run #2

Purge Volume

Run #1 Run #2 5.0 ml

File ID

BH40897.D

Volatile TPHC Ranges

CAS No.	Compound	Result	RL	MDL	Units
	C5- C8 Aliphatics (Unadj.) C9- C12 Aliphatics (Unadj.) C9- C10 Aromatics (Unadj.) C5- C8 Aliphatics C9- C12 Aliphatics	ND ND ND ND ND	50 50 50 50 50	8.8 8.0 9.7 8.8 8.0	ug/l ug/l ug/l ug/l ug/l
CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Lim	its
	2,3,4-Trifluorotoluene 2,3,4-Trifluorotoluene	98% 88%			30% 30%



E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank

N = Indicates presumptive evidence of a compound

Report of Analysis

By

TA

Prep Date

12/22/16

Page 1 of 1

Client Sample ID: FB120816 Lab Sample ID:

MC49129-3

AQ - Field Blank Water

Date Sampled: 12/08/16 Date Received: 12/14/16

Matrix: Method:

MADEP EPH REV 1.1 SW846 3510C

Percent Solids: n/a

Project:

BMSMC, Building 5 Area, Puerto Rico

Prep Batch **Analytical Batch**

Run #1

Run #2

OP49312

Q

GDE922

File ID

DE16513.D

Initial Volume Final Volume 920 ml $2.0 \, ml$

DF

1

Run #1

Run #2

Extractable TPHC Ranges

RL **MDL** Units CAS No. Compound Result

C11-C22 Aromatics (Unadj.) ND 110 31 ug/l C9-C18 Aliphatics ND 110 18 ug/l C19-C36 Aliphatics 29 ND 110 ug/l C11-C22 Aromatics ND 110 ug/l

Analyzed

12/27/16

CAS No. Surrogate Recoveries Run#1 Run#2 Limits

40-140% 84-15-1 o-Terphenyl 71% 40-140% 321-60-8 2-Fluorobiphenyl 70% 3386-33-2 1-Chlorooctadecane 49% 40-140% 580-13-2 2-Bromonaphthalene 73% 40-140%



ND = Not detected

MDL = Method Detection Limit

RL = Reporting Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank

Report of Analysis

AF

Page 1 of 1

Client Sample ID: S-34

Lab Sample ID: MC49129-4

File ID

BH40888.D

Matrix:

AO - Ground Water

Method:

MADEP VPH REV 1.1

DF

1

Analyzed

12/15/16

Date Sampled: 12/08/16 Date Received: 12/14/16

Percent Solids: n/a

Project:

BMSMC, Building 5 Area, Puerto Rico

By Prep Date

n/a

Prep Batch n/a

Analytical Batch GBH2442

Run #1 Run #2

Purge Volume

Run #1

5.0 ml

Run #2

Volatile TPHC Ranges

CAS No. Compound Result RL MDL Units Q C5- C8 Aliphatics (Unadj.) 15.2 50 8.8 ug/l C9- C12 Aliphatics (Unadj.) 16.3 50 8.0 ug/l J C9- C10 Aromatics (Unadj.) ND 50 9.7 ug/l C5- C8 Aliphatics 50 ND 8.8 ug/l 50 C9- C12 Aliphatics 9.5 8.0 ug/l J

CAS No. Surrogate Recoveries Run# 1 Run#2 Limits

> 2,3,4-Trifluorotoluene 2,3,4-Trifluorotoluene

97% 88% 70-130% 70-130%



ND = Not detected

MDL = Method Detection Limit

RL = Reporting Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank

N = Indicates presumptive evidence of a compound



MC49129

Report of Analysis

Page 1 of 1

Client Sample ID: S-34

Lab Sample ID: MC49129-4

Matrix: Method:

Project:

AQ - Ground Water

MADEP EPH REV 1.1 SW846 3510C BMSMC, Building 5 Area, Puerto Rico

Date Sampled: 12/08/16

Date Received: 12/14/16

Percent Solids: n/a

	File ID	DF	Analyzed	Ву	Prep Date	Prep Batch	Analytical Batch
Run #1	DE16514.D	1	12/27/16	TA	12/22/16	OP49312	GDE922
Run #2 a	DE16534.D	1	12/28/16	TA	12/22/16	OP49312	GDE923

	Initial Volume	Final Volume
Run #1	980 ml	2.0 ml
Run #2	980 ml	2.0 ml

Extractable TPHC Ranges

CAS No.	Compound	Result	RL	MDL	Units	Q
	C11-C22 Aromatics (Unadj.)	ND	100	29	ug/l	
	C9-C18 Aliphatics	ND	100	17	ug/l	
	C19-C36 Aliphatics	ND	100	28	ug/l	
	C11-C22 Aromatics	ND	100	29	ug/l	
CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Lim	its	
84-15-1	o-Terphenyl	59%	69%	40-1	40%	
321-60-8	2-Fluorobiphenyl	66%	84%	40-1	40%	
3386-33-2	1-Chlorooctadecane	36% b	36% b	40-1	40%	
580-13-2	2-Bromonaphthalene	69%	86%	40.1	40%	

(a) Confirmation run.

(b) Outside control limits due to possible matrix interference. Confirmed by refractionation/reanalysis.



ND = Not detected

MDL = Method Detection Limit

RL = Reporting Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank

Report of Analysis

Page 1 of 1

Client Sample ID: S-33

Lab Sample ID: MC49129-5

Matrix:

AQ - Ground Water

Method: Project:

MADEP VPH REV 1.1

BMSMC, Building 5 Area, Puerto Rico

Date Sampled: 12/08/16

Date Received: 12/14/16

Percent Solids: n/a

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	BH40889.D	1	12/15/16	AF	n/a	n/a	GBH2442
E 110							

Run #2

Purge Volume

Run #1 5.0 ml

Run #2

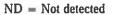
Volatile TPHC Ranges

CAS No.	Compound	Result	RL	MDL	Units	Q
	C5- C8 Aliphatics (Unadj.)	19.2	50	8.8	ug/l	J
	C9- C12 Aliphatics (Unadj.)	128	50	8.0	ug/l	
	C9- C10 Aromatics (Unadj.)	44.0	50	9.7	ug/l	J
	C5- C8 Aliphatics	10.4	50	8.8	ug/l	J
	C9- C12 Aliphatics	24.5	50	8.0	ug/l	J

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
---------	----------------------	--------	--------	--------

2,3,4-Trifluorotoluene	104%	70-130%
2,3,4-Trifluorotoluene	94%	70-130%





MDL = Method Detection Limit

RL = Reporting Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank



Report of Analysis

Page 1 of 1

Client Sample ID: S-33

Lab Sample ID: MC49129-5

Matrix: Method:

Project:

AO - Ground Water

MADEP EPH REV 1.1 SW846 3510C BMSMC, Building 5 Area, Puerto Rico

Date Sampled: 12/08/16

Date Received: 12/14/16

Percent Solids: n/a

Prep Batch Analytical Batch

Ву File ID DF Analyzed Prep Date 12/22/16 DE16535.D OP49312 **GDE923** Run #1 1 12/28/16 TA Run #2 a DE16515.D 1 12/27/16 TA 12/22/16 OP49312 **GDE922**

Initial Volume Final Volume Run #1 890 ml 2.0 ml Run #2 890 ml 2.0 ml

Extractable TPHC Ranges

CAS No.	Compound	Result	RL	MDL	Units	Q
	C11-C22 Aromatics (Unadj.) C9-C18 Aliphatics	ND ND	110 110	32 19	ug/l ug/l	
	C19-C36 Aliphatics	ND	110	30	ug/l	
	C11-C22 Aromatics	ND	110	32	ug/l	
CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Lim	its	
84-15-1	o-Terphenyl	43%	37% b	40-1	40%	
321-60-8	2-Fluorobiphenyl	86%	67%	40-1	40%	
3386-33-2	1-Chlorooctadecane	24% c	18% c	40-1	40%	
580-13-2	2-Bromonaphthalene	88%	69%	40-1	40%	

- (a) Confirmation run.
- (b) Outside control limits due to possible matrix interference.
- (c) Outside control limits due to possible matrix interference. Confirmed by refractionation/reanalysis.



ND = Not detected

MDL = Method Detection Limit

RL = Reporting Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank

Report of Analysis

Page 1 of 1

Client Sample ID: EB120916

Lab Sample ID: MC49129-6

Matrix: Method:

AQ - Equipment Blank

DF

1

MADEP VPH REV 1.1

Date Sampled: 12/09/16 Date Received: 12/14/16

Percent Solids: n/a

Project:

BMSMC, Building 5 Area, Puerto Rico

Analyzed

12/15/16

By

AF

Prep Date n/a

Prep Batch n/a

Analytical Batch GBH2442

Run #1 Run #2

Purge Volume

Run #1

5.0 ml

File ID

BH40896.D

Run #2

Volatile TPHC Ranges

CAS No.	S No. Compound		RL	MDL	Units	Q
	C5- C8 Aliphatics (Unadj.)	ND	50	8.8	ug/l	
	C9- C12 Aliphatics (Unadj.)	ND	50	8.0	ug/l	
	C9- C10 Aromatics (Unadj.)	ND	50	9.7	ug/I	
	C5- C8 Aliphatics	ND	50	8.8	ug/l	
	C9- C12 Aliphatics	ND	50	8.0	ug/l	
CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Lim	its	
	2,3,4-Trifluorotoluene	96%		70-1	30%	
	2,3,4-Trifluorotoluene	88%		70-1	30%	



ND = Not detected

MDL = Method Detection Limit

RL = Reporting Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

 $B = Indicates \ analyte \ found \ in \ associated \ method \ blank$

Report of Analysis

By

TA

Prep Date

12/22/16

Page 1 of 1

Client Sample ID: EB120916

Lab Sample ID: MC49129-6

File ID

DE16516.D

Matrix:

AQ - Equipment Blank

DF

MADEP EPH REV 1.1 SW846 3510C

BMSMC, Building 5 Area, Puerto Rico

Analyzed

12/27/16

Date Sampled: 12/09/16 Date Received: 12/14/16

OP49312

Percent Solids: n/a

Analytical Batch Prep Batch

GDE922

Run #1 Run #2

Method:

Project:

Initial Volume Final Volume

Run #1 980 ml 2.0 ml

Run #2

Extractable TPHC Ranges

CAS No.	Compound	Result	RL	MDL	Units	Q
	C11-C22 Aromatics (Unadj.)	ND	100	29	ug/l	
	C9-C18 Aliphatics	ND	100	17	ug/l	
	C19-C36 Aliphatics	ND	100	28	ug/l	
	C11-C22 Aromatics	ND	100	29	ug/l	
CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Lim	its	
84-15-1	o-Terphenyl	62%		40-1	40%	
321-60-8	2-Fluorobiphenyl	62%		40-1	40%	
3386-33-2	1-Chlorooctadecane	42%		40-1	40%	
580-13-2	2-Bromonaphthalene	65%		40-1	40%	
321-60-8 3386-33-2	2-Fluorobiphenyl 1-Chlorooctadecane	62% 42%		40-1 40-1	40% 40%	



ND = Not detected

MDL = Method Detection Limit

RL = Reporting Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank

Page 1 of 1

SGS Accutest LabLink@170707 09:11 29-Dec-2016

Report of Analysis

Client Sample ID: S-37

Lab Sample ID: MC49129-7

Matrix:

AQ - Ground Water

DF

1

Method: Project:

MADEP VPH REV 1.1

BMSMC, Building 5 Area, Puerto Rico

Date Sampled: 12/09/16

Date Received: 12/14/16

Percent Solids: n/a

Run #1 Run #2 File ID BH40890.D Analyzed 12/15/16

By AF Prep Date n/a

MDL

8.8

8.0

9.7

8.8

8.0

Units

ug/l

ug/l

ug/l

ug/I

ug/l

Prep Batch n/a

Q

Analytical Batch GBH2442

Purge Volume 5.0 ml

Run #1 Run #2

CAS No.

Volatile TPHC Ranges

CAS No. Compound

C5- C8 Aliphatics (Unadj.) C9- C12 Aliphatics (Unadj.)

C9- C10 Aromatics (Unadj.) C5- C8 Aliphatics C9- C12 Aliphatics

ND ND

Run#2

RL

50

50

50

50

50

Limits

2,3,4-Trifluorotoluene 2,3,4-Trifluorotoluene

Surrogate Recoveries

98% 90%

Run#1

Result

ND

ND

ND

70-130% 70-130%



E = Indicates value exceeds calibration range

B = Indicates analyte found in associated method blank

N = Indicates presumptive evidence of a compound

Report of Analysis

TA

12/22/16

Client Sample ID: S-37

Lab Sample ID: MC49129-7

DE16536.D

Matrix: Method: AQ - Ground Water

MADEP EPH REV 1.1 SW846 3510C

Date Sampled: 12/09/16 Date Received: 12/14/16

Percent Solids: n/a

Project: BMSMC, Building 5 Area, Puerto Rico

1

Ву File ID Analyzed Prep Date DF

12/28/16

Prep Batch Analytical Batch OP49312 **GDE923**

Run #1 Run #2

> Initial Volume Final Volume

Run #1

2.0 ml 970 ml

Run #2

Extractable TPHC Ranges

Compound	Result	RL	MDL	Units	Q
C11-C22 Aromatics (Unadj.)	ND	100	30	ug/l	
C9-C18 Aliphatics	ND	100	17	ug/l	
	ND	100	28		
C11-C22 Aromatics	ND	100	30	ug/l	
Surrogate Recoveries	Run# 1	Run# 2	Lim	its	
o-Terphenyl	80%		40-1	40%	
	93%		40-1	40%	
1-Chlorooctadecane	43%		40-1	40%	
2-Bromonaphthalene	95%		40-1	40%	.0
	C11-C22 Aromatics (Unadj.) C9-C18 Aliphatics C19-C36 Aliphatics C11-C22 Aromatics Surrogate Recoveries o-Terphenyl 2-Fluorobiphenyl 1-Chlorooctadecane	C11-C22 Aromatics (Unadj.) ND C9-C18 Aliphatics ND C19-C36 Aliphatics ND C11-C22 Aromatics ND Surrogate Recoveries Run# 1 o-Terphenyl 80% 2-Fluorobiphenyl 93% 1-Chlorooctadecane 43%	C11-C22 Aromatics (Unadj.) ND 100 C9-C18 Aliphatics ND 100 C19-C36 Aliphatics ND 100 C11-C22 Aromatics ND 100 Surrogate Recoveries Run# 1 Run# 2 o-Terphenyl 80% 2-Fluorobiphenyl 93% 1-Chlorooctadecane 43%	C11-C22 Aromatics (Unadj.) ND 100 30 C9-C18 Aliphatics ND 100 17 C19-C36 Aliphatics ND 100 28 C11-C22 Aromatics ND 100 30 Surrogate Recoveries Run# 1 Run# 2 Lim o-Terphenyl 80% 40-1 2-Fluorobiphenyl 93% 40-1 1-Chlorooctadecane 43% 40-1	C11-C22 Aromatics (Unadj.) ND 100 30 ug/l C9-C18 Aliphatics ND 100 17 ug/l C19-C36 Aliphatics ND 100 28 ug/l C11-C22 Aromatics ND 100 30 ug/l Surrogate Recoveries Run#1 Run#2 Limits o-Terphenyl 80% 40-140% 2-Fluorobiphenyl 93% 40-140% 1-Chlorooctadecane 43% 40-140%





MDL = Method Detection Limit

RL = Reporting Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank

Report of Analysis

Page 1 of 1

Client Sample ID: S-35

Lab Sample ID: MC49129-8

File ID

Matrix:

AQ - Ground Water

MADEP VPH REV 1.1

DF

1

SGS Accutest LabLink@170707 09:11 29-Dec-2016

Date Received: 12/14/16

Date Sampled: 12/09/16

Percent Solids: n/a

Method: Project:

BMSMC, Building 5 Area, Puerto Rico

Prep Batch

Analytical Batch

Run #1

BH40891.D

Analyzed 12/15/16

Ву AF Prep Date n/a

n/a

Q

GBH2442

Run #2

Purge Volume

Run #1

5.0 ml

Run #2

Volatile TPHC Ranges

CAS No. Compound

Result RL **MDL** Units ND ug/l

C5- C8 Aliphatics (Unadj.) C9- C12 Aliphatics (Unadj.) C9- C10 Aromatics (Unadj.) 50 8.8 50 8.0 50 9.7

ug/l 50 8.8 ug/l 50 8.0 ug/l

CAS No. Surrogate Recoveries

Run#1 Run#2 Limits

2,3,4-Trifluorotoluene 2,3,4-Trifluorotoluene

C5- C8 Aliphatics

C9- C12 Aliphatics

99% 90%

ND

ND

ND

ND

70-130% 70-130%

ug/l



ND = Not detected

MDL = Method Detection Limit

RL = Reporting Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank



Report of Analysis

Page 1 of 1

Client Sample ID: S-35

Lab Sample ID: MC49129-8

Matrix: Method:

Project:

AQ - Ground Water

MADEP EPH REV 1.1 SW846 3510C

BMSMC, Building 5 Area, Puerto Rico

Date Sampled: 12/09/16

Date Received: 12/14/16

Percent Solids: n/a

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	DE16518.D	1	12/27/16	TA	12/22/16	OP49312	GDE922
Run #2							

Initial Volume Final Volume 920 ml

Run #1

2.0 ml

Run #2

Extractable TPHC Ranges

CAS No.	Compound	Result	RL	MDL	Units	Q
	C11-C22 Aromatics (Unadj.) C9-C18 Aliphatics C19-C36 Aliphatics C11-C22 Aromatics	ND ND 99.3 ND	110 110 110 110	31 18 29 31	ug/l ug/l ug/l ug/l	J
CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Lim	its	
84-15-1 321-60-8 3386-33-2 580-13-2	o-Terphenyl 2-Fluorobiphenyl 1-Chlorooctadecane 2-Bromonaphthalene	73% 69% 50% 71%		40-1 40-1	40% 40% 40% 40%	



ND = Not detected

MDL = Method Detection Limit

RL = Reporting Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank

Report of Analysis

Page 1 of 1

Client Sample ID: S-35D

Lab Sample ID: MC49129-9

Matrix: Method:

Project:

AQ - Ground Water

MADEP VPH REV 1.1

BMSMC, Building 5 Area, Puerto Rico

Date Sampled: 12/09/16 Date Received: 12/14/16

Percent Solids: n/a

Run #1	File ID BH40892.D	DF 1	Analyzed 12/15/16	By AF	Prep Date	Prep Batch	Analytical Batch GBH2442
		-					

Run #2

Purge Volume

5.0 ml

Run #1 Run #2

Volatile TPHC Ranges

CAS No.	Compound	Result	RL	MDL	Units	Q
	C5- C8 Aliphatics (Unadj.)	ND	50	8.8	ug/l	
	C9- C12 Aliphatics (Unadj.)	ND	50	8.0	ug/l	
	C9- C10 Aromatics (Unadj.)	ND	50	9.7	ug/l	
	C5- C8 Aliphatics	ND	50	8.8	ug/l	
	C9- C12 Aliphatics	ND	50	8.0	ug/l	
CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Lim	its	
	2.3.4-Trifluorotoluene	99%		70-1	30%	
	2,3,4-Trifluorotoluene	90%		70-1	30%	



ND = Not detected

MDL = Method Detection Limit

RL = Reporting Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank

Report of Analysis

Page 1 of 1

Client Sample ID: S-35D

Lab Sample ID: MC49129-9

Matrix:

AQ - Ground Water

Date Received: 12/14/16

Date Sampled: 12/09/16

Method:

MADEP EPH REV 1.1 SW846 3510C

Project:

BMSMC, Building 5 Area, Puerto Rico

Percent Solids: n/a

Run #1

File ID DF DE16520.D 1

Analyzed Ву 12/27/16 TA Prep Date 12/22/16

Prep Batch OP49312

Analytical Batch **GDE922**

Run #2

Initial Volume

Final Volume

Run #1

940 ml

2.0 ml

Run #2

Extractable TPHC Ranges

CAS No.	Compound	Result	RL	MDL	Units	Q
	C11-C22 Aromatics (Unadj.)	ND	110	30	ug/l	
	C9-C18 Aliphatics	ND	110	18	ug/l	
	C19-C36 Aliphatics	ND	110	29	ug/l	
	C11-C22 Aromatics	ND	110	30	ug/l	
CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Lim	its	
84-15-1	o-Terphenyl	62%		40-1	40%	
321-60-8	2-Fluorobiphenyl	67%		40-1	40%	
3386-33-2	1-Chlorooctadecane	40%		40-1	40%	
580-13-2	2-Bromonaphthalene	69%		40-1	140%	



ND = Not detected

MDL = Method Detection Limit

RL = Reporting Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank

N = Indicates presumptive evidence of a compound



MC49129

Report of Analysis

By

AF

Page 1 of 1

Client Sample ID: FB120916 Lab Sample ID:

MC49129-10

Date Sampled: 12/09/16

Matrix:

AQ - Field Blank Water

DF

1

Date Received:

12/14/16

Method:

MADEP VPH REV 1.1

Percent Solids:

n/a

Project:

BMSMC, Building 5 Area, Puerto Rico

Analyzed

12/15/16

Prep Batch n/a

Prep Date

n/a

MDL

8.0

Units

Q

Analytical Batch GBH2442

Run #1 Run #2

Run #2

CAS No.

Purge Volume

Run #1 5.0 ml

File ID

BH40895.D

Volatile TPHC Ranges

CAS No.	Compound
	C5 C9 Aliphatics (Linadi)

50 8.8 ND ug/l C9- C12 Aliphatics (Unadj.) 50 8.0 ND ug/l C9- C10 Aromatics (Unadj.) ND 50 9.7 ug/l ug/l ND 50 8.8

50

RL

C5- C8 Aliphatics C9- C12 Aliphatics

ug/l Run#1 Run#2 Limits

2,3,4-Trifluorotoluene 2,3,4-Trifluorotoluene

Surrogate Recoveries

99% 90%

ND

Result

70-130% 70-130%



ND = Not detected

MDL = Method Detection Limit

RL = Reporting Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank

Report of Analysis

Client Sample ID: FB120916 Lab Sample ID:

MC49129-10

Matrix: Method: AQ - Field Blank Water

BMSMC, Building 5 Area, Puerto Rico

MADEP EPH REV 1.1 SW846 3510C

Date Sampled: 12/09/16 Date Received: 12/14/16

Percent Solids: n/a

	File ID	DF	Analyzed		Prep Date	•	Analytical Batch
Run #1	DE16521.D	1	12/27/16	TA	12/22/16	OP49312	GDE922

Run #2

Project:

Initial Volume Final Volume 950 ml

2.0 ml

Run #1 Run #2

Extractable TPHC Ranges

CAS No.	Compound	Result	RL	MDL	Units	Q
	C11-C22 Aromatics (Unadj.)	ND	110	30	ug/l	
	C9-C18 Aliphatics	ND	110	18	ug/l	
	C19-C36 Aliphatics	ND	110	29	ug/l	
	C11-C22 Aromatics	ND	110	30	ug/l	
CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Lim	its	
84-15-1	o-Terphenyl	68%		40-1	40%	
321-60-8	2-Fluorobiphenyl	67%		40-1	40%	
3386-33-2	1-Chlorooctadecane	45%		40-1	40%	
580-13-2	2-Bromonaphthalene	70%		40-1	40%	
						•



ND = Not detected

MDL = Method Detection Limit

RL = Reporting Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank

N = Indicates presumptive evidence of a compound

Report of Analysis

Page 1 of 1

Client Sample ID: S-36

Lab Sample ID: MC49129-11

Matrix: Method:

Project:

AQ - Ground Water

MADEP VPH REV 1.1

BMSMC, Building 5 Area, Puerto Rico

Date Sampled: 12/09/16

Q

Date Received: 12/14/16

Percent Solids: n/a

File ID Ву **Analytical Batch** Prep Date Prep Batch DF Analyzed Run #1 GBH2442 BH40893.D 1 12/15/16 AF n/a n/a Run #2

Purge Volume

Run #1

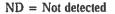
Run #2

5.0 ml

Volatile TPHC Ranges

Compound	Result	RL	MDL	Units
C5- C8 Aliphatics (Unadj.)	ND ND	50 50	8.8	ug/l ug/l
C9- C10 Aromatics (Unadj.)	ND	50	9.7	ug/l
C5- C8 Aliphatics	ND	50	8.8	ug/l
C9- C12 Aliphatics	ND	50	8.0	ug/l
Surrogate Recoveries	Run# 1	Run# 2	Lim	its
2,3,4-Trifluorotoluene	96%		70-1	30%
2.3.4-Trifluorotoluene	86%		70-1	30%
	C5- C8 Aliphatics (Unadj.) C9- C12 Aliphatics (Unadj.) C9- C10 Aromatics (Unadj.) C5- C8 Aliphatics C9- C12 Aliphatics Surrogate Recoveries 2,3,4-Trifluorotoluene	C5- C8 Aliphatics (Unadj.) ND C9- C12 Aliphatics (Unadj.) ND C9- C10 Aromatics (Unadj.) ND C5- C8 Aliphatics ND C9- C12 Aliphatics ND Surrogate Recoveries Run# 1 2,3,4-Trifluorotoluene 96%	C5- C8 Aliphatics (Unadj.) ND 50 C9- C12 Aliphatics (Unadj.) ND 50 C9- C10 Aromatics (Unadj.) ND 50 C5- C8 Aliphatics ND 50 C9- C12 Aliphatics ND 50 Surrogate Recoveries Run#1 Run#2 2,3,4-Trifluorotoluene 96%	C5- C8 Aliphatics (Unadj.) ND 50 8.8 C9- C12 Aliphatics (Unadj.) ND 50 8.0 C9- C10 Aromatics (Unadj.) ND 50 9.7 C5- C8 Aliphatics ND 50 8.8 C9- C12 Aliphatics ND 50 8.0 Surrogate Recoveries Run# 1 Run# 2 Lim 2,3,4-Trifluorotoluene 96% 70-1





MDL = Method Detection Limit

RL = Reporting Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank

Report of Analysis

By

TA

Page 1 of 1

Client Sample ID: S-36

Lab Sample ID: MC49129-11

Matrix:

AQ - Ground Water

MADEP EPH REV 1.1 SW846 3510C

Date Received: 12/14/16

Date Sampled: 12/09/16

Method: Project:

BMSMC, Building 5 Area, Puerto Rico

Percent Solids: n/a

Run #1

File ID DE16522.D Analyzed 12/27/16

Prep Date 12/22/16

Prep Batch OP49312

Q

Analytical Batch **GDE922**

Run #2

Run #1

Initial Volume

990 ml

Final Volume

DF

Run #2

2.0 ml

Extractable TPHC Ranges

CAS No. Compound		RL	MDL	Units
C11-C22 Aromatics (Unadj.)	ND	100	29	ug/l
C9-C18 Aliphatics	ND	100	17	ug/l
C19-C36 Aliphatics	ND	100	27	ug/l
C11-C22 Aromatics	ND	100	29	ug/l
Surrogate Recoveries	Run# 1	Run# 2	Lim	its
o-Terphenyl	62%		40-1	40%
2-Fluorobiphenyl	62%		40-1	40%
1-Chlorooctadecane	44%		40-1	40%
2-Bromonaphthalene	64%		40-1	40%
	C11-C22 Aromatics (Unadj.) C9-C18 Aliphatics C19-C36 Aliphatics C11-C22 Aromatics Surrogate Recoveries o-Terphenyl 2-Fluorobiphenyl 1-Chlorooctadecane	C11-C22 Aromatics (Unadj.) ND C9-C18 Aliphatics ND C19-C36 Aliphatics ND C11-C22 Aromatics ND Surrogate Recoveries Run# 1 o-Terphenyl 62% 2-Fluorobiphenyl 62% 1-Chlorooctadecane 44%	C11-C22 Aromatics (Unadj.) ND 100 C9-C18 Aliphatics ND 100 C19-C36 Aliphatics ND 100 C11-C22 Aromatics ND 100 Surrogate Recoveries Run# 1 Run# 2 o-Terphenyl 62% 2-Fluorobiphenyl 62% 1-Chlorooctadecane 44%	C11-C22 Aromatics (Unadj.) ND 100 29 C9-C18 Aliphatics ND 100 17 C19-C36 Aliphatics ND 100 27 C11-C22 Aromatics ND 100 29 Surrogate Recoveries Run# 1 Run# 2 Lim o-Terphenyl 62% 40-1 2-Fluorobiphenyl 62% 40-1 1-Chlorooctadecane 44% 40-1



ND = Not detected

MDL = Method Detection Limit

RL = Reporting Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank

Report of Analysis

By

AF

Page 1 of 1

Client Sample ID: S-39D

Lab Sample ID:

MC49129-12

Matrix:

DF

1

AQ - Ground Water

Method: Project:

MADEP VPH REV 1.1

Analyzed

12/15/16

Date Sampled: 12/12/16

n/a

Q

Date Received: 12/14/16 Percent Solids: n/a

BMSMC, Building 5 Area, Puerto Rico

Prep Date

n/a

Prep Batch

Analytical Batch

GBH2442

Run #1 Run #2

Purge Volume

BH40875.D

Run #1

5.0 ml

File ID

Run #2

Volatile TPHC Ranges

CAS No.	Compound	Result	RL	MDL	Units	
	C5- C8 Aliphatics (Unadj.)	ND	50	8.8	ug/l	
	C9- C12 Aliphatics (Unadj.)	ND	50	8.0	ug/l	
	C9- C10 Aromatics (Unadj.)	ND	50	9.7	ug/l	
	C5- C8 Aliphatics	ND	50	8.8	ug/l	
	C9- C12 Aliphatics	ND	50	8.0	ug/l	
CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Lim	its	
	2,3,4-Trifluorotoluene	95%		70-1	30%	
	2,3,4-Trifluorotoluene	89%		70-1	30%	





MDL = Method Detection Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank

N = Indicates presumptive evidence of a compound

Report of Analysis

By

TA

Page 1 of 1

Client Sample ID: S-39D

Lab Sample ID:

MC49129-12

AQ - Ground Water

Date Sampled: 12/12/16

Matrix: Method:

MADEP EPH REV 1.1 SW846 3510C

Date Received: 12/14/16

Project:

BMSMC, Building 5 Area, Puerto Rico

Percent Solids: n/a

Run #1 Run #2 File ID DF DE16523.D 1

Analyzed 12/27/16

Prep Date 12/22/16

Prep Batch OP49312

Q

Analytical Batch GDE922

Initial Volume 990 ml

Final Volume

Run #1

2.0 ml

Run #2

Extractable TPHC Ranges

CAS No.	Compound	Result	RL	MDL	Units
	C11-C22 Aromatics (Unadj.)	ND	100	29	ug/l
	C9-C18 Aliphatics	ND	100	17	ug/l
	C19-C36 Aliphatics	ND	100	27	ug/l
	C11-C22 Aromatics	ND	100	29	ug/l
CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Lim	its
84-15-1	o-Terphenyl	69%		40-1	40%
321-60-8	2-Fluorobiphenyl	65%		40-1	40%
3386-33-2	1-Chlorooctadecane	41%		40-1	40%
580-13-2	2-Bromonaphthalene	68%		40-1	40%



ND = Not detected

MDL = Method Detection Limit

RL = Reporting Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank

Report of Analysis

Page 1 of 1

Analytical Batch

GBH2442

Client Sample ID: S-39S

Lab Sample ID: MC49129-13

Matrix: Method:

AQ - Ground Water

MADEP VPH REV 1.1

Date Sampled: 12/12/16 Date Received: 12/14/16

Percent Solids: n/a

Project:

BMSMC, Building 5 Area, Puerto Rico

File ID DF Analyzed Prep Date Prep Batch By Run #1 BH40882.D 1 12/15/16 **AF** n/a n/a

Run #2

Run #1

Purge Volume 5.0 ml

Run #2

Volatile TPHC Ranges

CAS No.	Compound	Result	RL	MDL	Units	Q
	C5- C8 Aliphatics (Unadj.)	18.7	50	8.8	ug/l	J
	C9- C12 Aliphatics (Unadj.)	1400	50	8.0	ug/l	
	C9- C10 Aromatics (Unadj.)	10	50	9.7	ug/l	J
	C5- C8 Aliphatics	18.0	50	8.8	ug/l	J
	C9- C12 Aliphatics	59.7	50	8.0	ug/l	

CAS No. Surrogate Recoveries Run#1 Run#2 Limits

> 2,3,4-Trifluorotoluene 100% 2,3,4-Trifluorotoluene 92%

70-130% 70-130%



ND = Not detected

MDL = Method Detection Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank

N = Indicates presumptive evidence of a compound

Report of Analysis

Page 1 of 1

Client Sample ID: S-39S

Lab Sample ID: MC49129-13

Matrix: Method:

Project:

AQ - Ground Water

MADEP EPH REV 1.1 SW846 3510C BMSMC, Building 5 Area, Puerto Rico

Date Sampled: 12/12/16 Date Received: 12/14/16

Percent Solids: n/a

	File ID	DF	Analyzed	Ву	Prep Date	Prep Batch	Analytical Batch
Run #1	DE16524.D	1	12/27/16	TA	12/22/16	OP49312	GDE922

Run #2

Initial Volume Final Volume

980 ml

2.0 ml

Run #1 Run #2

Extractable TPHC Ranges

CAS No.	Compound	Result	RL	MDL	Units	Q
	C11-C22 Aromatics (Unadj.)	ND	100	29	ug/l	
	C9-C18 Aliphatics	84.9	100	17	ug/l	J
	C19-C36 Aliphatics	98.8	100	28	ug/l	J
	C11-C22 Aromatics	ND	100	29	ug/l	
CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Lim	its	

84-15-1	o-Terphenyl	64%	40-140%
321-60-8	2-Fluorobiphenyl	73%	40-140%
3386-33-2	1-Chlorooctadecane	40%	40-140%
580-13-2	2-Bromonaphthalene	76%	40-140%





MDL = Method Detection Limit

RL = Reporting Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank

N = Indicates presumptive evidence of a compound

Report of Analysis

Page 1 of 1

Client Sample ID: FB121216 Lab Sample ID:

MC49129-14

Matrix:

AQ - Field Blank Water

Method: Project:

MADEP VPH REV 1.1

BMSMC, Building 5 Area, Puerto Rico

Date Sampled: 12/12/16

Date Received: 12/14/16

Percent Solids: n/a

	File ID	DF	Analyzed	Ву	Prep Date	Prep Batch	Analytical Batch
Run #1	BH40898.D	1	12/15/16	AF	n/a	n/a	GBH2442

Run #2

Purge Volume

Run #1 Run #2

5.0 ml

Volatile TPHC Ranges

CAS No.	Compound	Result	RL	MDL	Units	Q
	C5- C8 Aliphatics (Unadj.)	ND	50	8.8	ug/l	
	C9- C12 Aliphatics (Unadj.)	ND	50	8.0	ug/l	
	C9- C10 Aromatics (Unadj.)	ND	50	9.7	ug/l	
	C5- C8 Aliphatics	ND	50	8.8	ug/l	
	C9- C12 Aliphatics	ND	50	8.0	ug/l	
CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Lim	its	

2,3,4-Trifluorotoluene 98% 70-130% 2,3,4-Trifluorotoluene 90% 70-130%





MDL = Method Detection Limit

RL = Reporting Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank

Report of Analysis

Page 1 of 1

Client Sample ID: FB121216 Lab Sample ID:

MC49129-14 AQ - Field Blank Water Date Sampled: 12/12/16 Date Received: 12/14/16

Matrix: Method:

MADEP EPH REV 1.1 SW846 3510C

Percent Solids: n/a

Q

Project:

BMSMC, Building 5 Area, Puerto Rico

Analytical Batch Prep Batch

File ID DF Analyzed By Prep Date Run #1 DE16525.D 12/28/16 TA 12/22/16 OP49312 **GDE922** 1 Run #2 a DE16537.D 1 12/28/16 TA 12/22/16 OP49312 **GDE923**

	Initial Volume	Final Volume
Run #1	940 ml	2.0 ml
Run #2	940 ml	2.0 ml

Extractable TPHC Ranges

CAS No.	Compound	Result	RL	MDL	Units
	C11-C22 Aromatics (Unadj.) C9-C18 Aliphatics C19-C36 Aliphatics C11-C22 Aromatics	ND ND ND ND	110 110 110 110	30 18 29 30	ug/l ug/l ug/l ug/l
CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limi	ts
84-15-1 321-60-8 3386-33-2 580-13-2	o-Terphenyl 2-Fluorobiphenyl 1-Chlorooctadecane 2-Bromonaphthalene	61% 66% 38% ^b 69%	70% 84% 32% ^b 86%	40-14 40-14 40-14	40% 40%

- (a) Confirmation run.
- (b) Outside control limits. Confirmed by refractionation/reanalysis.



ND = Not detected

MDL = Method Detection Limit

RL = Reporting Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

 $B = Indicates \ analyte \ found \ in \ associated \ method \ blank$

Report of Analysis

Page 1 of 1

Client Sample ID: S-28

Lab Sample ID: MC49129-15

Matrix: Method:

Project:

AQ - Ground Water

MADEP VPH REV 1.1

BMSMC, Building 5 Area, Puerto Rico

Date Sampled: 12/12/16

Q

Percent Solids: n/a

Date Received: 12/14/16

Analytical Batch File ID DF Analyzed Ву Prep Date Prep Batch 12/15/16 n/a **GBH2442** Run #1 BH40894.D 1 AF n/a

Run #2

Purge Volume

Run #1 5.0 ml

Run #2

Volatile TPHC Ranges

CAS No.	Compound	Result	RL	MDL	Units
	C5- C8 Aliphatics (Unadj.)	ND	50	8.8	ug/l
	C9- C12 Aliphatics (Unadj.)	ND	50	8.0	ug/l
	C9- C10 Aromatics (Unadj.)	ND	50	9.7	ug/l
	C5- C8 Aliphatics	ND	50	8.8	ug/l
	C9- C12 Aliphatics	ND	50	8.0	ug/l
CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Lim	its
	2,3,4-Trifluorotoluene	98%		70-1	30%
	2,3,4-Trifluorotoluene	89%		70-1	30%



MDL = Method Detection Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank

N = Indicates presumptive evidence of a compound

Report of Analysis

By

TA

Page 1 of 1

Client Sample ID: S-28

Lab Sample ID:

MC49129-15

Matrix:

AQ - Ground Water

DF

1

MADEP EPH REV 1.1 SW846 3510C

Date Received: 12/14/16

Date Sampled: 12/12/16

Prep Date

12/22/16

Percent Solids: n/a

Method: Project:

BMSMC, Building 5 Area, Puerto Rico

Analyzed

12/28/16

Prep Batch OP49312

Q

J

Analytical Batch **GDE922**

Run #1 Run #2

File ID

DE16526.D

Initial Volume Final Volume

Run #1 980 ml

2.0 ml

Run #2

Extractable TPHC Ranges

CAS No.	Compound	Result	RL	MDL	Units
	C11-C22 Aromatics (Unadj.)	ND	100	29	ug/l
	C9-C18 Aliphatics	19.6	100	17	ug/l
	C19-C36 Aliphatics	ND	100	28	ug/l
	C11-C22 Aromatics	ND	100	29	ug/l
CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Lim	its
84-15-1	o-Terphenyl	70%		40-1	40%
321-60-8	2-Fluorobiphenyl	68%		40-1	40%
3386-33-2	1-Chlorooctadecane	44%		40-1	40%
580-13-2	2-Bromonaphthalene	71%		40-1	40%





MDL = Method Detection Limit

RL = Reporting Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank

Report of Analysis

Page 1 of 1

Client Sample ID: S-32

Lab Sample ID:

MC49129-16

Matrix: Method: AQ - Ground Water

MADEP VPH REV 1.1

Date Received: 12/14/16

Date Sampled: 12/12/16

Percent Solids: n/a

Project: BMSMC, Building 5 Area, Puerto Rico

Run #1	File ID BH40880.D	DF 1	Analyzed 12/15/16	By AF	Prep Date	Prep Batch n/a	Analytical Batch GBH2442
Run #2	BH40881.D	100	12/15/16	AF	n/a	n/a	GBH2442

1	Purge Volume		
Run #1	5.0 ml		
Run #2	5.0 ml		
1			

Volatile TPHC Ranges

CAS No.	Compound	Result	RL	MDL	Units	Q
	C5- C8 Aliphatics (Unadj.)	94.5	50	8.8	ug/l	
	C9- C12 Aliphatics (Unadj.) C9- C10 Aromatics (Unadj.)	95900 ^a 530	5000 50	800 9.7	ug/l ug/l	
	C5- C8 Aliphatics	40.4	50	8.8	ug/l	J
	C9- C12 Aliphatics	2250	50	8.0	ug/l	
CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Lim	its	
	2,3,4-Trifluorotoluene	145% b	96%	70-1	30%	
	2,3,4-Trifluorotoluene	136% b	90%	70-1	30%	

- (a) Result is from Run# 2
- (b) Outside control limits due to possible matrix interference.



ND = Not detected

MDL = Method Detection Limit

RL = Reporting Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank



Report of Analysis

Page 1 of 1

Client Sample ID: S-32

Lab Sample ID:

MC49129-16

AQ - Ground Water

Date Sampled: 12/12/16

Matrix: Method:

MADEP EPH REV 1.1 SW846 3510C

DF

1

Date Received: 12/14/16

Project:

BMSMC, Building 5 Area, Puerto Rico

Percent Solids: n/a

Run #1

File ID DE16538.D Analyzed 12/28/16

Ву Prep Date TA 12/22/16

Prep Batch OP49312

Analytical Batch **GDE923**

Run #2

Initial Volume Final Volume 940 ml

Run #1 Run #2 2.0 ml

Extractable TPHC Ranges

CAS No.	Compound	Result	RL	MDL	Units	Q
	C11-C22 Aromatics (Unadj.)	ND	110	30	ug/l	
	C9-C18 Aliphatics	ND	110	18	ug/l	
	C19-C36 Aliphatics	64.1	110	29	ug/l	J
	C11-C22 Aromatics	ND	110	30	ug/l	
CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Lim	its	
84-15-1	o-Terphenyl	48%		40-1	40%	
321-60-8	2-Fluorobiphenyl	88%		40-1	40%	
3386-33-2	1-Chlorooctadecane	51%		40-1	40%	
580-13-2	2-Bromonaphthalene	91%		40-1	40%	
	-					



ND = Not detected

MDL = Method Detection Limit

RL = Reporting Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank

Report of Analysis

Ву

AF

Page 1 of 1

Client Sample ID: FB121216 Lab Sample ID:

MC49129-17

Date Received: 12/14/16

Prep Date

n/a

Date Sampled: 12/12/16

Matrix: Method: AQ - Field Blank Water MADEP VPH REV 1.1

DF

1

Percent Solids: n/a

n/a

Project:

BMSMC, Building 5 Area, Puerto Rico

Analyzed

12/15/16

Prep Batch **Analytical Batch**

GBH2442

Run #1 Run #2

Purge Volume

File ID

BH40899.D

Run #1 Run #2 5.0 ml

Volatile TPHC Ranges

CAS No.	Compound	Result	RL	MDL	Units	Q
	C5- C8 Aliphatics (Unadj.)	ND	50	8.8	ug/l	
	C9- C12 Aliphatics (Unadj.)	ND	50	8.0	ug/l	
	C9- C10 Aromatics (Unadj.)	ND	50	9.7	ug/l	
	C5- C8 Aliphatics	ND	50	8.8	ug/l	
	C9- C12 Aliphatics	ND	50	8.0	ug/l	
CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Lim	its	
	2,3,4-Trifluorotoluene	98%		70-1	30%	
	2,3,4-Trifluorotoluene	89%		70-1	30%	



ND = Not detected

MDL = Method Detection Limit

RL = Reporting Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank

Report of Analysis

Ву

TA

Page 1 of 1

Client Sample ID: FB121216 Lab Sample ID:

MC49129-17

AQ - Field Blank Water

DF

1

Date Sampled: 12/12/16

Q

Date Received: 12/14/16

Matrix: Method:

MADEP EPH REV 1.1 SW846 3510C

Percent Solids: n/a

Project:

BMSMC, Building 5 Area, Puerto Rico

Analyzed

12/28/16

Prep Batch OP49312

Analytical Batch **GDE922**

Run #1 Run #2

Initial Volume

DE16528.D

Final Volume

Prep Date

12/22/16

Run #1

950 ml

File ID

2.0 ml

Run #2

Extractable TPHC Ranges

CAS No.	Compound	Resuit	RL	MDL	Units
	C11-C22 Aromatics (Unadj.)	ND	110	30	ug/l
	C9-C18 Aliphatics	ND	110	18	ug/l
	C19-C36 Aliphatics	ND	110	29	ug/l
	C11-C22 Aromatics	ND	110	30	ug/l
CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Lim	its
84-15-1	o-Terphenyl	75%		40-1	40%
321-60-8	2-Fluorobiphenyl	71%		40-1	40%
3386-33-2	1-Chlorooctadecane	51%		40-1	40%
580-13-2	2-Bromonaphthalene	75%		40-1	40%



ND = Not detected

MDL = Method Detection Limit

RL = Reporting Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank

Page 1 of 1

Job Number: MC49129 AMANYWP Anderson Mulholland and Assoc. Account:

BMSMC, Building 5 Area, Puerto Rico Project:

Sample MC49129-12MS MC49129-12MSD MC49129-12	File ID BH40876.D BH40877.D BH40875.D	DF 1 1	Analyzed 12/15/16 12/15/16 12/15/16	By AF AF AF	Prep Date n/a n/a n/a	Prep Batch n/a n/a n/a	Analytical Batch GBH2442 GBH2442 GBH2442

The QC reported here applies to the following samples:

MC49129-1, MC49129-2, MC49129-3, MC49129-4, MC49129-5, MC49129-6, MC49129-7, MC49129-8, MC49129-9, MC49129-10, MC49129-11, MC49129-12, MC49129-13, MC49129-14, MC49129-15, MC49129-16, MC49129-17

CAS No.	Compound	MC49129- ug/l C		MS ug/l	MS %	Spike ug/l	MSD ug/l	MSD %	RPD	Limits Rec/RPD
	C5- C8 Aliphatics (Unadj.) C9- C12 Aliphatics (Unadj.) C9- C10 Aromatics (Unadj.)	ND ND ND	300 450 150	278 438 146	93 109 97	300 450 150	277 434 145	93 108 97	0 1 1	70-130/25 70-130/25 70-130/25
CAS No.	Surrogate Recoveries	MS	MSD	M	C49129-	12 Limits				
	2,3,4-Trifluorotoluene 2,3,4-Trifluorotoluene	95% 89%	95% 88%	95°		70-130 ⁹	-			



Method: MADEP VPH REV 1.1

^{* =} Outside of Control Limits.

Matrix Spike/Matrix Spike Duplicate Summary

Job Number: MC49129

Account: AMANYWP Anderson Mulholland and Assoc. Project: BMSMC, Building 5 Area, Puerto Rico

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP49312-MS	DE16509.D	1	12/27/16	TA	12/22/16	OP49312	GDE922
OP49312-MSD	DE16510.D	1	12/27/16	TA	12/22/16	OP49312	GDE922
MC49129-12	DE16523.D		12/27/16	TA	12/22/16	OP49312	GDE922

The QC reported here applies to the following samples:

Method: MADEP EPH REV 1.1

Page 1 of 1

MC49129-1, MC49129-2, MC49129-3, MC49129-4, MC49129-5, MC49129-6, MC49129-7, MC49129-8, MC49129-9, MC49129-10, MC49129-11, MC49129-12, MC49129-13, MC49129-14, MC49129-15, MC49129-16, MC49129-17

		MC49129-	12 Spike	MS	MS	Spike	MSD	MSD		Limits
CAS No.	Compound	ug/l Q	ug/l	ug/l	%	ug/l	ug/l	%	RPD	Rec/RPD
	C11-C22 Aromatics (Unadj.)	ND	825	533	65	851	589	69	10	40-140/25
	C9-C18 Aliphatics	ND	309	168	54	319	190	60	12	40-140/25
	C19-C36 Aliphatics	ND	412	315	76	426	338	79	7	40-140/25
CAS No.	Surrogate Recoveries	MS	MSD	M	C49129-	12 Limits				
84-15-1	o-Terphenyl	66%	70%	69	%	40-1409	%			
321-60-8	2-Fluorobiphenyl	72%	73%	659	%	40-1409	%			
3386-33-2	1-Chlorooctadecane	40%	45%	419	%	40-1409	%			
580-13-2	2-Bromonaphthalene	74%	75%	689	%	40-1409	%			



^{* =} Outside of Control Limits.

10
ACCUTEST:

CHAIN OF CUSTODY

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MC49129: Chain of Custody Page 1 of 4

CHAIN OF CUSTODY

PAGE P OF P	PAGE	<u>2</u> of	2
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MC49129: Chain of Custody Page 2 of 4

EXECUTIVE NARRATIVE

SDG No:

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MC49129

Laboratory:

Accutest, Massachusetts

Analysis:

MADEP VPH

Number of Samples:

19

Location:

BMSMC, Building 5 Area

Humacao, PR

SUMMARY:

Nineteen (19) samples were analyzed for Volatiles TPHC Ranges by method MADEP VPH. Samples were validated following the METHOD FOR THE DETERMINATION OF VOLATILE PETROLEUM HYDROCARBONS (VPH) quality control criteria, Massachusetts Department of Environmental Protection, Revision 1.1 (2004). Also the general validation guidelines promulgated by the USEPA Hazardous Wastes Support Section. The QC criteria and data validation actions listed on the data review worksheets are from the primary guidance document, unless otherwise noted.

Results are valid and can be used for decision making purposes.

Critical issues:

None

Major:

None

Minor:

None

Critical findings:

None

Major findings:

None

Minor findings:

- 1. Continuing and final calibration verification meets method specific requirements except in the cases described in this document. The % difference for VPH in the rt5.5/7 retention time window in the continuing and ending calibration verification was outside the method performance criteria. Results are qualified as estimated in affected samples.
- 2. Surrogate recovery outside control limits in sample MC49129-16. No action taken, professional judgment. Outside control limits due to matrix interferences. Surrogate recovery in the diluted sample within laboratory control limits.

COMMENTS:

Results are valid and can be used for decision making purposes.

Reviewers Name:

Rafael Infante

Chemist License 1888

Signature:

Date:

January 22, 2017

SAMPLE ORGANIC DATA SAMPLE SUMMARY

Sample ID: MC49129-1

Sample location: BMSMC Building 5 Area

Sampling date: 12/8/2016 Matrix: Groundwater

METHOD: MADEP VPH

Analyte Name	Result	Units D	ilution Factor	Lab Flag	Validation	Reportable
Ç5 - C8 Aliphatics (Unadj.)	32.2	ug/L	1	J	J	Yes
Ç9 - C12 Aliphatics (Unadj.)	647	ug/L	1	-	-	Yes
Ç9 - C10 Aromatics (Unadj.)	14.2	ug/L	1	J	J	Yes
Ç5 - C8 Aliphatics	50	ug/L	1	-	UJ	Yes
C9 - C12 Aliphatics	40.1	ug/L	1	J	J	Yes

Sample ID: MC49129-2

Sample location: BMSMC Building 5 Area

Sampling date: 12/8/2016 Matrix: Groundwater

Analyte Name	Result	Units Di	lution Factor	Lab Flag	Validation	Reportable
Ç5 - C8 Aliphatics (Unadj.)	383	ug/L	1	-	J	Yes
Ç9 - C12 Aliphatics (Unadj.)	641	ug/L	1	-	-	Yes
Ç9 - C10 Aromatics (Unadj.)	58.7	ug/L	1	-	-	Yes
Ç5 - C8 Aliphatics	578	ug/L	1	-	J	Yes
Ç9 - C12 Aliphatics	70.0	ug/L	1	-	-	Yes

Sample location: BMSMC Building 5 Area

Sampling date: 12/8/2016

Matrix: AQ - Field Blank Water

METHOD: MADEP VPH

Analyte Name	Result	Units Di	lution Factor	Lab Flag	Validation	Reportable
Ç5 - C8 Aliphatics (Unadj.)	50	ug/L	1	-	UJ	Yes
Ç9 - C12 Aliphatics (Unadj.)	50	ug/L	1	-	U	Yes
Ç9 - C10 Aromatics (Unadj.)	50	ug/L	1	-	U	Yes
Ç5 - C8 Aliphatics	50	ug/L	1	-	UJ	Yes
Ç9 - C12 Aliphatics	50	ug/L	1	-	U	Yes

Sample ID: MC49129-4

Sample location: BMSMC Building 5 Area

Sampling date: 12/8/2016 Matrix: Groundwater

Analyte Name	Result	Units D	ilution Factor	Lab Flag	Validation	Reportable
Ç5 - C8 Aliphatics (Unadj.)	15.2	ug/L	1	J	J	Yes
Ç9 - C12 Aliphatics (Unadj.)	16.3	ug/L	1	J	J	Yes
Ç9 - C10 Aromatics (Unadj.)	50	ug/L	1	-	U	Yes
Ç5 - C8 Aliphatics	50	ug/L	1	-	UJ	Yes
Ç9 - C12 Aliphatics	9.5	ug/L	1	J	J	Yes

Sample location: BMSMC Building 5 Area

Sampling date: 12/8/2016

Matrix: Groundwater

METHOD: MADEP VPH

Analyte Name	Result	Units D	ilution Factor	Lab Flag	Validation	Reportable
Ç5 - C8 Aliphatics (Unadj.)	19.2	ug/L	1	J	J	Yes
Ç9 - C12 Aliphatics (Unadj.)	128	ug/L	1	-	-	Yes
Ç9 - C10 Aromatics (Unadj.)	44.0	ug/L	1	J	J	Yes
Ç5 - C8 Aliphatics	10.4	ug/L	1	J	J	Yes
Ç9 - C12 Aliphatics	24.5	ug/L	1	J	J	Yes

Sample ID: MC49129-6

Sample location: BMSMC Building 5 Area

Sampling date: 12/9/2016

Matrix: AQ - Equipment Blank

Analyte Name	Result	Units Di	lution Factor	Lab Flag	Validation	Reportable
Ç5 - C8 Aliphatics (Unadj.)	50	ug/L	1	-	UJ	Yes
Ç9 - C12 Aliphatics (Unadj.)	50	ug/L	1	-	U	Yes
Ç9 - C10 Aromatics (Unadj.)	50	ug/L	1	-	U	Yes
Ç5 - C8 Aliphatics	50	ug/L	1	-	UJ	Yes
Ç9 - C12 Aliphatics	50	ug/L	1	-	U	Yes

Sample location: BMSMC Building 5 Area

Sampling date: 12/9/2016 Matrix: Groundwater

METHOD: MADEP VPH

Analyte Name	Result	Units Di	lution Factor	Lab Flag	Validation	Reportable
Ç5 - C8 Aliphatics (Unadj.)	50	ug/L	1	-	UJ	Yes
Ç9 - C12 Aliphatics (Unadj.)	50	ug/L	1	-	U	Yes
Ç9 - C10 Aromatics (Unadj.)	50	ug/L	1	-	U	Yes
Ç5 - C8 Aliphatics	50	ug/L	1	-	UJ	Yes
Ç9 - C12 Aliphatics	50	ug/L	1	-	U	Yes

Sample ID: MC49129-8

Sample location: BMSMC Building 5 Area

Sampling date: 12/9/2016 Matrix: Groundwater

Analyte Name	Result	Units Di	lution Factor	Lab Flag	Validation	Reportable
Ç5 - C8 Aliphatics (Unadj.)	50	ug/L	1	-	UJ	Yes
Ç9 - C12 Aliphatics (Unadj.)	50	ug/L	1	-	U	Yes
Ç9 - C10 Aromatics (Unadj.)	50.0	ug/L	1	-	U	Yes
Ç5 - C8 Aliphatics	50	ug/L	1	-	UJ	Yes
Ç9 - C12 Aliphatics	50	ug/L	1	-	U	Yes

Sample location: BMSMC Building 5 Area

Sampling date: 12/9/2016

Matrix: Groundwater

METHOD: MADEP VPH

Analyte Name	Result	Units Di	lution Factor	Lab Flag	Validation	Reportable
Ç5 - C8 Aliphatics (Unadj.)	50	ug/L	1	-	UJ	Yes
Ç9 - C12 Aliphatics (Unadj.)	50	ug/L	1	-	U	Yes
Ç9 - C10 Aromatics (Unadj.)	50	ug/L	1	-	U	Yes
Ç5 - C8 Aliphatics	50	ug/L	1	-	UJ	Yes
Ç9 - C12 Aliphatics	50	ug/L	1	-	U	Yes

Sample ID: MC49129-10

Sample location: BMSMC Building 5 Area

Sampling date: 12/9/2016

Matrix: AQ - Field Blank Water

Analyte Name	Result	Units Di	lution Factor	Lab Flag	Validation	Reportable
Ç5 - C8 Aliphatics (Unadj.)	50	ug/L	1	-	UJ	Yes
Ç9 - C12 Aliphatics (Unadj.)	50	ug/L	1	-	U	Yes
Ç9 - C10 Aromatics (Unadj.)	50	ug/L	1	-	U	Yes
Ç5 - C8 Aliphatics	50	ug/L	1	-	UJ	Yes
C9 - C12 Aliphatics	50	ug/L	1	_	U	Yes

Sample location: BMSMC Building 5 Area

Sampling date: 12/9/2016

Matrix: Groundwater

METHOD: MADEP VPH

Analyte Name	Result	Units Di	lution Factor	Lab Flag	Validation	Reportable
Ç5 - C8 Aliphatics (Unadj.)	50	ug/L	1	-	UJ	Yes
Ç9 - C12 Aliphatics (Unadj.)	50	ug/L	1	-	U	Yes
Ç9 - C10 Aromatics (Unadj.)	50	ug/L	1	-	U	Yes
Ç5 - C8 Aliphatics	50	ug/L	1	-	UJ	Yes
Ç9 - C12 Aliphatics	50	ug/L	1	-	U	Yes

Sample ID: MC49129-12

Sample location: BMSMC Building 5 Area

Sampling date: 12/12/2016 Matrix: Groundwater

Analyte Name	Result	Units Di	lution Factor	Lab Flag	Validation	Reportable
Ç5 - C8 Aliphatics (Unadj.)	50	ug/L	1	-	UJ	Yes
Ç9 - C12 Aliphatics (Unadj.)	50	ug/L	1	-	U	Yes
Ç9 - C10 Aromatics (Unadj.)	50	ug/L	1	-	U	Yes
Ç5 - C8 Aliphatics	50	ug/L	1	-	UJ	Yes
Ç9 - C12 Aliphatics	50	ug/L	1	-	U	Yes

Sample location: BMSMC Building 5 Area

Sampling date: 12/12/2016

Matrix: Groundwater

METHOD: MADEP VPH

Analyte Name	Result	Units D	ilution Factor	Lab Flag	Validation	Reportable
Ç5 - C8 Aliphatics (Unadj.)	18.7	ug/L	1	J	J	Yes
Ç9 - C12 Aliphatics (Unadj.)	1400	ug/L	1	-	-	Yes
Ç9 - C10 Aromatics (Unadj.)	10	ug/L	1	J	J	Yes
Ç5 - C8 Aliphatics	18.0	ug/L	1	J	J	Yes
Ç9 - C12 Aliphatics	59.7	ug/L	1	-	-	Yes

Sample ID: MC49129-14

Sample location: BMSMC Building 5 Area

Sampling date: 12/12/2016

Matrix: AQ -Field Blank Water

Analyte Name	Result	Units Di	lution Factor	Lab Flag	Validation	Reportable
Ç5 - C8 Aliphatics (Unadj.)	50	ug/L	1	-	UJ	Yes
Ç9 - C12 Aliphatics (Unadj.)	50	ug/L	1	-	U	Yes
Ç9 - C10 Aromatics (Unadj.)	50	ug/L	1	-	U	Yes
Ç5 - C8 Aliphatics	50	ug/L	1	-	UJ	Yes
C9 - C12 Aliphatics	50	ug/L	1	_	U	Yes

Sample location: BMSMC Building 5 Area

Sampling date: 12/12/2016

Matrix: Groundwater

METHOD: MADEP VPH

Analyte Name	Result	Units Di	lution Factor	Lab Flag	Validation	Reportable
Ç5 - C8 Aliphatics (Unadj.)	50	ug/L	1	-	UJ	Yes
Ç9 - C12 Aliphatics (Unadj.)	50	ug/L	1	-	U	Yes
Ç9 - C10 Aromatics (Unadj.)	50	ug/L	1	-	U	Yes
Ç5 - C8 Aliphatics	50	ug/L	1	-	UJ	Yes
Ç9 - C12 Aliphatics	50	ug/L	1	-	U	Yes

Sample ID: MC49129-16

Sample location: BMSMC Building 5 Area

Sampling date: 12/12/2016

Matrix: Groundwater

Analyte Name	Result	Units D	ilution Factor	Lab Flag	Validation	Reportable
Ç5 - C8 Aliphatics (Unadj.)	94.5	ug/L	1	-	J	Yes
Ç9 - C12 Aliphatics (Unadj.)	95900	ug/L	100	-	-	Yes
Ç9 - C10 Aromatics (Unadj.)	530	ug/L	1	-	-	Yes
Ç5 - C8 Aliphatics	40.5	ug/L	1	J	J	Yes
Ç9 - C12 Aliphatics	2250	ug/L	1	-	-	Yes

Sample location: BMSMC Building 5 Area

Sampling date: 12/12/2016

Matrix: AQ -Field Blank Water

METHOD: MADEP VPH

Analyte Name	Result	Units Di	lution Factor	Lab Flag	Validation	Reportable
Ç5 - C8 Aliphatics (Unadj.)	50	ug/L	1	-	UJ	Yes
Ç9 - C12 Aliphatics (Unadj.)	50	ug/L	1	-	U	Yes
Ç9 - C10 Aromatics (Unadj.)	50	ug/L	1	-	U	Yes
Ç5 - C8 Aliphatics	50	ug/L	1	-	UJ	Yes
Ç9 - C12 Aliphatics	50	ug/L	1	-	U	Yes

Sample ID: MC49129-12MS

Sample location: BMSMC Building 5 Area

Sampling date: 12/12/2016 Matrix: Groundwater

Analyte Name	Result	Units Di	lution Factor	Lab Flag	Validation	Reportable
Ç5 - C8 Aliphatics (Unadj.)	278	ug/L	1	-	J	Yes
Ç9 - C12 Aliphatics (Unadj.)	438	ug/L	1	-	-	Yes
Ç9 - C10 Aromatics (Unadj.)	146	ug/L	1	-	-	Yes

Sample ID: MC49129-12MSD

Sample location: BMSMC Building 5 Area

Sampling date: 12/12/2016 Matrix: Groundwater

Analyte Name	Result	Units D	ilution Factor	Lab Flag	Validation	Reportable
Ç5 - C8 Aliphatics (Unadj.)	277	ug/L	1	-	J	Yes
Ç9 - C12 Aliphatics (Unadj.)	434	ug/L	1	-	-	Yes
Ç9 - C10 Aromatics (Unadj.)	145	ug/L	1	-	-	Yes

DATA REVIEW WORKSHEETS

Type of validation	Full:X Limited:	Project Number:_MC49129
REVIEW OF	VOLATILE PETROLE	UM HYDROCARBON (VPHs) PACKAGE
actions. This docume informed decision and assessed according to METHOD FOR THE I Massachusetts Depart validation guidelines p	nt will assist the review in better serving the of the data validation guided DETERMINATION OF Nument of Environmental promulgated by the US dation actions listed on	organics were created to delineate required validation wer in using professional judgment to make more needs of the data users. The sample results were ance documents in the following order of precedence /OLATILE PETROLEUM HYDROCARBONS (VPH), Protection, Revision 1.1 (2004). Also the general EPA Hazardous Wastes Support Section. The QC the data review worksheets are from the primary
The hardcopied (lab received has been rev review for SVOCs inclu	riewed and the quality c	test_Laboratories data package ontrol and performance data summarized. The data
No. of Samples: Field blank No.: Equipment blank No.: _	MC49129-3;_MC491 MC49129-6;_MC491; 	29-10;_MC49129-17 29-14
X Data CompleX Holding TimeN/A GC/MS TuninN/A Internal StandX BlanksX Surrogate ReX Matrix Spike/	s g dard Performance coveries	X Laboratory Control SpikesX Field DuplicatesX CalibrationsX Compound IdentificationsX Compound QuantitationX Quantitation Limits
OverallVolatiles_by_GC_by_	Method_MADEP_VPH,_	REV_1.1
Definition of Qualifiers:		
J- Estimated results U- Compound not R- Rejected data UJ- Estimated none Reviewer:	detected	

	Criteria were no	All criteria were metx ot met and/or see below
. DATA COMPLETNI A. Data Packaç		
	DATE LAB. CONTACTED	DATE RECEIVED
10 T E		
3. Other		Discrepancies:

All criteria were met	_X
Criteria were not met and/or see below	

HOLDING TIMES

The objective of this parameter is to ascertain the validity of the results based on the holding time of the sample from time of collection to the time of extraction, and subsequently from the time of extraction to the time of analysis.

Complete table for all samples and note the analysis and/or preservation not within criteria

SAMPLE ID	DATE SAMPLED	DATE EXTRACTED	DATE ANALYZED	ACTION
Samples ana		nod recommende		ample preservation
			_	

Criteria

Preservation:

Samples analyzed with ambient purge temperature: Samples must be acidified to a pH of 2.0 or less at the time of collection.

Samples analyzed with heated purge temperature: Samples must be treated to a pH of 11.0 or greater at the time of collection.

Methanol preservation of soil/sediment samples is mandatory. Methanol (purgeand-trap grade) must be added to the sample vial before or immediately after sample collection. In lieu of the in-field preservation of samples with methanol, soil samples may be obtained in specially-designed air tight sampling devices, provided that the samples are extruded and preserved in methanol within 48 hours of collection.

Holding times:

Aqueous samples using ambient or heated purge - analyze within 14 days. Soil/sediment samples - analysis within 28 days.

Cooler temperature	(Criteria: 4	4 + 2 '	°C):	: 4.8°C	}

Actions: Qualify positive results/non-detects as follows:

If holding times are exceeded, estimate positive results (J) and nondetects (UJ).

If holding times are grossly exceeded, use professional judgment to qualify data. The data reviewer may choose to estimate positive results (J) and rejects nondetects (R).

If samples were not at the proper temperature (> 10°C) or improperly preserved, use professional judgment to qualify the results.

		All criteria were metX Criteria were not met and/or see below
CALIBRAT	IONS VERIFIC	ATION
		for satisfactory instrument calibration are established to ensure ble of producing and maintaining acceptable quantitative data.
		Date of initial calibration:10/31/16
		Dates of initial calibration verification:10/31/16_
		Instrument ID numbers:GCBH
		Matrix/Level:AQUEOUS/MEDIUM
DATE	LAB FILE	ANALYTE CRITERIA OUT SAMPLES

Initial and initial calibration verification meet method specific requirements

Criteria- ICAL

• Five point calibration curve.

ID#

The percent relative standard deviation (%RSD) of the calibration factor must be
equal to or less than 25% over the working range for the analyte of interest. When
this condition is met, linearity through the origin may be assumed, and the average
calibration factor is used in lieu of a calibration curve.

RFs, %RSD, %D, r

AFFECTED

A collective calibration factor must also be established for each hydrocarbon range
of interest. Calculate the collective CFs for C5-C8 Aliphatic Hydrocarbons and C9C12 Aliphatic Hydrocarbons using the FID chromatogram. Calculate the collective
CF for the C9-C10 Aromatic Hydrocarbons using the PID chromatogram. Tabulate
the summation of the peak areas of all components in that fraction against the total
concentration injected. The %RSD of the calibration factor must be equal to or less
than 25% over the working range for the hydrocarbon range of interest.

Criteria- CCAL

- At a minimum, the working calibration factor must be verified on each working day, after every 20 samples, and at the end of the analytical sequence by the injection of a mid-level continuing calibration standard to verify instrument performance and linearity.
- If the percent difference (%D) for any analyte varies from the predicted response by more than ±25%, a new five-point calibration must be performed for that analyte. Greater percent differences are permissible for n-nonane. If the %D for n-nonane is greater than 30, note the nonconformance in the case narrative. It should be noted that the %Ds are calculated when CFs are used for the initial calibration and

DATA REVIEW WORKSHEETS

percent drifts are calculated when calibration curves using linear regression are used for the initial calibration.

Actions:

If %RSD > 25% for target compounds or a correlation coefficient < 0.99, estimate positive results (J) and use professional judgment to qualify nondetects. If % D > 25% (> 30 for nonane), estimate positive results (J) and nondetects (UJ).

CALIBRATIONS VERIFICATION

Compliance requirements for satisfactory instrument calibration are established to ensure that the instrument is capable of producing and maintaining acceptable quantitative data.

Date of initial calibration:	10/31/16	_
Dates of continuing calibrat	ion verification:12/15/16	_
Dates of final calibration ve	rification:_10/31/16;_12/16/16	
Instrument ID numbers:	GCBH	
Matrix/Level:	AQUEOUS/MEDIUM	

DATE	LAB FILE ID#	ANALYTE	CRITERIA OUT RFs, %RSD, <u>%D,</u> r	SAMPLES AFFECTED
12/15/16	cc2394-50	rt5.5/7	25.3	MC49129-1 to -17; MC49129-12MS/- 12MSD
12/16/16	cc2394-50	rt5.5/7	25.4	MC49129-1 to -17; MC49129-12MS/- 12MSD

Note: Continuing and final calibration verification meets method specific requirements except in the cases described in this document. The % difference for VPH in the rt5.5/7 retention time window in the continuing and ending calibration verification was outside the method performance criteria. Results are qualified as estimated in affected samples.

A separate worksheet should be filled for each initial curve

			Criteria were not	All criteria were metX_	
V A. BLANK	ANALYSIS RI	ESULTS (Sed	ctions 1 & 2)		
of contamination associated with with any blank determine when problem is an	on problems. In the samples, Is exist, all da Ither or not the Isolated occu- Iter samples si	The criteria including tri ta associate ere is an inherrence not a	for evaluation on p, equipment, and d with the case erent variability in fecting other dat	ne the existence and magniture of blanks apply only to blank also apply only to blank also apply only to blank also also also also also also also also	nks ms to the ank
List the contant separately.	nination in the	blanks belo	w. High and low	levels blanks must be treat	ted
Laboratory blan	ıks				
DATE ANALYZED	LAB ID	LEVEL/ MATRIX	COMPOUND	CONCENTRATION UNITS	
Note:				ANKS	
<u>Field</u> /Trip/ <u>Equi</u>	<u>pment</u>				
				should continually accompaively, during sampling, storage	
DATE ANALYZED	LAB ID	LEVEL/ MATRIX	COMPOUND	CONCENTRATION UNITS	
_NO_TRIP_BL	ANK_ASSOCI	ATED_WITH	I_THIS_DATA_PA	CKAGE	_
_NO_TARGET	_ANALYTES_	DETECTED_	_IN_FIELD/EQUIF	MENT_BLANKS_ANALYZE	D.
				2 Harisan	_
Note:					

DATA REVIEW WORKSHEETS

V B. BLANK ANALYSIS RESULTS (Section 3)

Blank Actions

The ALs for samples which have been diluted should be corrected for the sample dilution factor and/or % moisture, where applicable. Peaks must not be detected above the Reporting Limit within the retention time window of any analyte of interest. The hydrocarbon ranges must not be detected at a concentration greater than 10% of the most stringent MCP cleanup standard. Specific actions area as follows:

If the concentration is < sample quantitation limit (SQL) and < AL, report the compound as not detected (U) at the SQL.

If the concentration is \geq SQL but < AL, report the compound as not detected (U) at the reported concentration.

If the concentration is > AL, report the concentration unqualified.

OAMBLE ID

All criteria were met X	
Criteria were not met and/or see below	

ACTION

SURROGATE SPIKE RECOVERIES

Laboratory performance of individual samples is established by evaluation of surrogate spike recoveries. All samples are spiked with surrogate compounds prior to sample analysis. The accuracy of the analysis is measured by the surrogate percent recovery. Since the effects of the sample matrix are frequently outside the control of the laboratory and may present relatively unique problems, the validation of data is frequently subjective and demands analytical experience and professional judgment.

List the percent recoveries (%Rs) which do not meet the criteria for surrogate recovery. Matrix: solid/aqueous

* CUDDOCATE COMPOUND

SAIVIPLE ID	2,3,4-Trifluorotolue			ACTION
	_STANDARD_RECO PT_FOR_THE_CASI			
MC49129-16	145_%/136_	%		NO_ACTION
ir	lo action taken, profe nterferences. Surroga ontrol limits.			
QC Limits* (Aqu LL_to_U QC Limits* (Soli	L70_to_130_	to	to	
LL_to_U		to	to	

It is recommended that surrogate standard recoveries be monitored and documented on a continuing basis. At a minimum, when surrogate recovery from a sample, blank, or QC sample is less than 70% or more than 130%, check calculations to locate possible errors, check the fortifying standard solution for degradation, and check changes in instrument performance.

If the cause cannot be determined, reanalyze the sample unless one of the following exceptions applies:

- (1) Obvious interference is present on the chromatogram (e.g., unresolved complex mixture);
- (2) Percent moisture of associated soil/sediment sample is >25% and surrogate recovery is >10%; or
- (3) The surrogate exhibits high recovery and associated target analytes or hydrocarbon ranges are not detected in sample.

If a sample with a surrogate recovery outside of the acceptable range is not reanalyzed based on any of these aforementioned exceptions, this information must be noted on the data report form and discussed in the Executive Report. Analysis of the sample on dilution may diminish matrix-related surrogate recovery problems. This approach can be used as long as the reporting limits to evaluate applicable MCP standards can still be achieved with the dilution. If not, reanalysis without dilution must be performed.

All criteria were metX
Criteria were not met and/or see below

VII. A MATRIX SPIKE/MATRIX SPIKE DUPLICATE (MS/MSD)

This data is generated to determine long term precision and accuracy in the analytical method for various matrices. This data alone cannot be used to evaluate the precision and accuracy of individual samples.

At the request of the data user, and in consideration of sample matrices and data quality objectives, matrix spikes and matrix duplicates may be analyzed with every batch of 20 samples or less per matrix.

- Matrix duplicate Matrix duplicates are prepared by analyzing one sample in duplicate. The purpose of the matrix duplicates is to determine the homogeneity of the sample matrix as well as analytical precision. The RPD of detected results in the matrix duplicate samples must not exceed 50 when the results are greater than 5x the reporting limit.
- The desired spiking level is 50% of the highest calibration standard. However, the total concentration in the MS (including the MS and native concentration in the unspiked sample) should not exceed 75% of the highest calibration standard in order for a proper evaluation to be performed. The purpose of the matrix spike is to determine whether the sample matrix contributes bias to the analytical results. The corrected concentrations of each analyte within the matrix spiking solution must be within 70 130% of the true value. Lower recoveries of n-nonane are permissible (if included in the calibration of the C9-C12 aliphatic range), but must be noted in the narrative if <30%.</p>

MS/MSD Recoveries and Precision Criteria	
Sample ID:_MC49129-12_MS/MSD	Matrix/Level:_Groundwater
List the %Rs, RPD of the compounds which do not	meet the QC criteria.

Note: MS/MSD % recovery and RPD within laboratory control limits.

No action is taken on MS/MSD results alone to qualify the entire case. However, used informed professional judgment, the data reviewer may use the MS/MSD results in conjunction with other QC criteria and determine the need for some qualification of the data. In those instances where it can be determined that the results of the MS/MSD affect only the sample spiked, the qualification should be limited to this sample alone. However, it may be determined through the MS/MSD results that the laboratory is having a systematic problem in the analysis of one or more analytes, which affects the associated samples.

DATA REVIEW WORKSHEETS

2. MS/MSD – Unspiked Compounds

List the concentrations of the unspiked compounds and determine the % RSDs of these compounds in the unspiked sample, matrix spike, and matrix spike duplicate.

COMPOUND	CONCENTRA SAMPLE	ATION MS	MSD	%RPD	ACTION
			 -		

Criteria: None specified, use %RSD ≤ 50 as professional judgment.

Actions:

If the % RSD > 50, qualify the results in the spiked sample as estimate (J). If the % RSD is not calculable (NC) due to nondetect value in the sample, MS, and/or MSD, use professional judgment to qualify sample data.

A separate worksheet should be used for each MS/MSD pair.

All criteria were met _	_X
Criteria were not met and/or see below	

VIII. LABORATORY CONTROL SAMPLE (LCS/LCSD) ANALYSIS

This data is generated to determine accuracy of the analytical method for various matrices.

1. LCS Recoveries Criteria

List the %R of compounds which do not meet the criteria

LCS ID	COMPOUND	% R	QC LIMIT	ACTION	
LCS_RE	COVERY_WITHIN_L	ABORATORY	_CONTROL_LIM	TS	

				1.00	

Criteria:

- * Refer to QAPP for specific criteria.
- * The spike recovery must be between 70% and 130%. Lower recoveries of nnonane are permissible (if included in the calibration of the C9-C12 aliphatic range). If the recovery of n-nonane is <30%, note the nonconformance in the executive narrative.

Actions:

Actions on LCS recovery should be based on both the number of compounds that are outside the %R criteria and the magnitude of the excedance of the criteria.

If the %R of the analyte is > UL, qualify all positive results (j) for the affected analyte in the associated samples and accept nondetects.

If the %R of the analyte is < LL, qualify all positive results (j) and reject (R) nondetects for the affected analyte in the associated samples.

If more than half the compounds in the LCS are not within the required recovery criteria, qualify all positive results as (J) and reject nondetects (R) for all target analyte(s) in the associated samples.

2. Frequency Criteria:

Where LCS analyzed at the required frequency and for each matrix (1 per 20 samples per matrix)? <u>Yes</u> or No.

If no, the data may be affected. Use professional judgment to determine the severity of the effect and qualify data accordingly. Discuss any actions below and list the samples affected. Discuss the actions below:

		All criteria were metN/A_ Criteria were not met and/or see below	
IX.	FIELD/LABORATORY DUPLICATE I	PRECISION	
Sampl	le IDs:	Matrix:	_

Field/laboratory duplicates samples may be taken and analyzed as an indication of overall precision. These analyses measure both field and lab precision; therefore, the results may have more variability than laboratory duplicates which measures only laboratory performance. It is also expected that soil duplicate results will have a greater variance than water matrices due to difficulties associated with collecting identical field duplicate samples.

COMPOUND	SQL	SAMPLE CONC.	DUPLICATE CONC.	RPD	ACTION	
No field/laboratory duplicate analyzed with this data package. MS/MSD % recovery RPD used to assess precision. RPD within laboratory and validation guidance document criteria (± 50 %) for analytes detected above reporting limits.						
01110	<u> </u>			inting.		

Criteria:

The project QAPP should be reviewed for project-specific information. RPD \pm 30% for aqueous samples, RPD \pm 50 % for solid samples if results are \geq SQL. If both samples and duplicate are <5 SQL, the RPD criteria is doubled.

SQL = soil quantitation limit

Actions:

If both the sample and the duplicate results are nondetects (ND), the RPD is not calculable (NC). No action is needed.

Qualify as estimated positive results (J) and nondetects (UJ) for the compound that exceeded the above criteria.

If one sample result is not detected and the other is $\geq 5x$ the SQL qualify (J/UJ).

Note: If SQLs for the sample and duplicate are significantly different, use professional judgment to determine if qualification is appropriate.

If one sample value is not detected and the other is < 5x the SQL, use professional judgment to determine if qualification is appropriate.

All criteria were met _	_X
Criteria were not met and/or see below	

XI. COMPOUND IDENTIFICATION

The compound identification evaluation is to verify that the laboratory correctly identified target analytes as well as tentatively identified compounds (TICs).

- 1. Verify that the target analytes were within the retention time windows.
 - Retention time windows must be re-established for each Target VPH
 Analyte each time a new GC column is installed, and must be verified and/or
 adjusted on a daily basis.
 - o Coelution of the m- and p- xylene isomers is permissible.
 - o All surrogates must be adequately resolved from individual Target Analytes included in the VPH Component Standard.
 - For the purposes of this method, adequate resolution is assumed to be achieved if the height of the valley between two peaks is less than 25% of the average height of the two peaks.
 - o The n-pentane (C5) and MtBE peaks must be adequately resolved from any solvent front that may be present on the FID and PID chromatograms, respectively.

Note: Target analytes were within the retention time window.

2. If target analytes and/or TICs were not correctly identified, request that the laboratory resubmit the corrected data.

		_		na were met^	
	Criteria were not met and/or see below _				
XII.	QUANTITATION LIMITS AND SAMPLE RESULTS				
The s	ample quantitati	on evaluation is to verify l	aboratory quantitation re	esults.	
1.	In the space b	elow, please show a minir	mum of one sample calc	ulation:	
MC49	1129-1	VPH (C9 -	- C12 Aliphatics)	RF = 9.607 x 10 ⁵	
FID		,	•		
[]=(2	21327229)/(9.60	07 x 10⁵)			
[]=2	2.2 ppb Ok				
MC49	129-1	VPH (C9 -	- C10 Aromatics)	RF = 5.148 x 10 ⁵	
PID				0	
	7286382)/(5.148	8 x 10 ⁵)			
[] = (200002//(0.140	7 10)			
[]=1	4.2 ppb Ok				
2. (MDLs	•	erify that the results were	above the laboratory m	ethod detection limit	
3.		formed, were the SQLs eamples and dilution factor		the laboratory? List	
5	SAMPLE ID	DILUTION FACTOR	REASON FOR	DILUTION	
MC4	9129-16	100 x	C9 – C12 aliphatics of range.	ver the calibration	
If dilui	tion was not nor	formed and the results we	ere above the concentra	ition range, estimate	
		cted compounds. List the			

EXECUTIVE NARRATIVE

SDG No:

MC49129

Laboratory:

Accutest, Massachusetts

Analysis:

MADEP EPH

Number of Samples:

19

Location:

BMSMC, Building 5 Area

Humacao, PR

SUMMARY:

Nineteen (19) samples were analyzed for Extractable TPHC Ranges by method MADEP EPH. Samples were validated following the METHOD FOR THE DETERMINATION OF EXTRACTABLE PETROLEUM HYDROCARBONS (EPH) quality control criteria, Massachusetts Department of Environmental Protection, Revision 1.1 (2004). Also the general validation guidelines promulgated by the USEPA Hazardous Wastes Support Section. The QC criteria and data validation actions listed on the data review worksheets are from the primary guidance document, unless otherwise noted.

Results are valid and can be used for decision making purposes.

Critical issues:

None

Major:

None

Minor:

None

Critical findings:

None

Major findings:

None

Minor findings:

- 1. Continuing and final calibration verification meets method specific requirements except in the cases described in this document. The % difference for EPH in the C11-C22 (Aromatics) retention time window in the continuing and ending calibration verification was outside the method performance criteria. Results are qualified as estimated in affected samples.
- 2. 1-chlorooctadecane recovered outside the laboratory control limits in samples MC49129-2; -4; -5 and -14. o-Terphenyl outside control limit in sample MC491-5. Outside control limits due to possible matrix interference. Confirmed by refractionation/reanalysis. No action taken.

COMMENTS:

Results are valid and can be used for decision making purposes.

Reviewers Name:

Rafael Infante

Chemist License 1888

Signature:

January 22, 2017

Date:

SAMPLE ORGANIC DATA SAMPLE SUMMARY

Sample ID: MC49129-1

Sample location: BMSMC Building 5 Area

Sampling date: 12/8/2016 Matrix: Groundwater

METHOD: MADEP EPH

Analyte Name	Result	Units I	Dilution Factor	Lab Flag	Validation	Reportable
Ç11 - C22 Aromatics (Unadj.)	79.6	ug/L	1	J	J	Yes
Ç9 - C18 Aliphatics	18.4	ug/L	1	J	J	Yes
Ç19 - C36 Aliphatics	110	ug/L	1	-	U	Yes
Ç11 - C22 Aromatics	78.9	ug/L	1	J	J	Yes

Sample ID: MC49129-2

Sample location: BMSMC Building 5 Area

Sampling date: 12/8/2016 Matrix: Groundwater

Analyte Name	Result	Units D	ilution Factor	Lab Flag	Validation	Reportable
Ç11 - C22 Aromatics (Unadj.)	110	ug/L	1	-	UJ	Yes
Ç9 - C18 Aliphatics	110	ug/L	1	0.75	U	Yes
Ç19 - C36 Aliphatics	110	ug/L	1	-	U	Yes
Ç11 - C22 Aromatics	110	ug/L	1	-	UJ	Yes 🖊

Sample location: BMSMC Building 5 Area

Sampling date: 12/8/2016

Matrix: AQ - Field Blank Water

METHOD: MADEP EPH

Analyte Name	Result	Units Di	lution Factor	Lab Flag	Validation	
Ç11 - C22 Aromatics (Unadj.)	110	ug/L	1	-	UJ	Yes 🗸
Ç9 - C18 Aliphatics	110	ug/L	1	-	U	Yes
Ç19 - C36 Aliphatics	110	ug/L	1	_	U	Yes
Ç11 - C22 Aromatics	110	ug/L	1	-	UJ	Yes

Sample ID: MC49129-4

Sample location: BMSMC Building 5 Area

Sampling date: 12/8/2016 Matrix: Groundwater

METHOD: MADEP EPH

Analyte Name	Result	Units [Dilution Factor	Lab Flag	Validation	
Ç11 - C22 Aromatics (Unadj.)	100	ug/L	1	-	UJ	Yes
Ç9 - C18 Aliphatics	100	ug/L	1	7	U	Yes
Ç19 - C36 Aliphatics	100	ug/L	1	2	U	Yes
Ç11 - C22 Aromatics	100	ug/L	1	-	UJ	Yes 🗸

Sample ID: MC49129-5

Sample location: BMSMC Building 5 Area

Sampling date: 12/8/2016 Matrix: Groundwater METHOD: MADEP EPH

Analyte Name	Result	Units Di	lution Factor	Lab Flag	Validation	Reportable
Ç11 - C22 Aromatics (Unadj.)	110	ug/L	1	-	UJ	Yes
Ç9 - C18 Aliphatics	110	ug/L	1	-	U	Yes
Ç19 - C36 Aliphatics	110	ug/L	1	-	U	Yes
Ç11 - C22 Aromatics	110	ug/L	1	-	UJ	Yes 🌙

Sample location: BMSMC Building 5 Area

Sampling date: 12/9/2016

Matrix: AQ - Equipment Blank

METHOD: MADEP EPH

Analyte Name	Result	Units [Dilution Factor	Lab Flag	Validation	
Ç11 - C22 Aromatics (Unadj.)	100	ug/L	1	-	UJ	Yes
Ç9 - C18 Aliphatics	100	ug/L	1	-	U	Yes
Ç19 - C36 Aliphatics	100	ug/L	1	-	U	Yes
Ç11 - C22 Aromatics	100	ug/L	1	-	UJ	Yes 🖊

Sample ID: MC49129-7

Sample location: BMSMC Building 5 Area

Sampling date: 12/9/2016

Matrix: Groundwater

METHOD: MADEP EPH

Analyte Name	Result	Units Di	lution Factor	Lab Flag	Validation	Reportable
Ç11 - C22 Aromatics (Unadj.)	100	ug/L	1	-	_UJ	Yes 🗸
Ç9 - C18 Aliphatics	100	ug/L	1	-	U	Yes
Ç19 - C36 Aliphatics	100	ug/L	1	-	U	Yes
Ç11 - C22 Aromatics	100	ug/L	1	-	UJ"	Yes

Sample ID: MC49129-8

Sample location: BMSMC Building 5 Area

Sampling date: 12/9/2016 Matrix: Groundwater METHOD: MADEP EPH

Analyte Name	Result	Units D	ilution Factor	Lab Flag	Validation	Reportable
Ç11 - C22 Aromatics (Unadj.)	110	ug/L	1	-	UJ	Yes 🖊
Ç9 - C18 Aliphatics	110	ug/L	1	-	U	Yes
Ç19 - C36 Aliphatics	99.3	ug/L	1	J	J	Yes
Ç11 - C22 Aromatics	110	ug/L	1	-	UJ	Yes 🖊

Sample location: BMSMC Building 5 Area

Sampling date: 12/9/2016 Matrix: Groundwater METHOD: MADEP EPH

Analyte Name	Result	Units D	Dilution Factor	Lab Flag	Validation	Reportable
Ç11 - C22 Aromatics (Unadj.)	110	ug/L	1	-	UJ	Yes V/
Ç9 - C18 Aliphatics	110	ug/L	1	-	U	Yes
Ç19 - C36 Aliphatics	110	ug/L	1	-	U	Yes
Ç11 - C22 Aromatics	110	ug/L	1	-	UJ	Yes

Sample ID: MC49129-10

Sample location: BMSMC Building 5 Area

Sampling date: 12/9/2016

Matrix: AQ - Field Blank Water

METHOD: MADEP EPH

Analyte Name	Result	Units Di	lution Factor	Lab Flag	Validation	Reportable
Ç11 - C22 Aromatics (Unadj.)	110	ug/L	1	-	UJ	Yes 🗸 🖊
Ç9 - C18 Aliphatics	110	ug/L	1	-	U	Yes
Ç19 - C36 Aliphatics	110	ug/L	1	-	U	Yes
Ç11 - C22 Aromatics	110	ug/L	1	-	UJ	Yes 🖊

Sample ID: MC49129-11

Sample location: BMSMC Building 5 Area

Sampling date: 12/9/2016 Matrix: Groundwater METHOD: MADEP EPH

Analyte Name	Result	Units Di	lution Factor	Lab Flag	Validation	Reportable
Ç11 - C22 Aromatics (Unadj.)	100	ug/L	1	-	ÜJ	Yes 🖊
Ç9 - C18 Aliphatics	100	ug/L	1	-	U	Yes
Ç19 - C36 Aliphatics	100	ug/L	1	-	U	Yes
C11 - C22 Aromatics	100	ug/L	1	_	UJ	Yes V/

Sample location: BMSMC Building 5 Area

Sampling date: 12/12/2016 Matrix: Groundwater METHOD: MADEP EPH

Analyte Name	Result	Units D	ilution Factor	Lab Flag	Validation	Reportable
Ç11 - C22 Aliphatics (Unadj.)	100	ug/L	1	-	UJ	Yes
Ç9 - C18 Aliphatics	100	ug/L	1	-	U	Yes
Ç19 - C36 Aliphatics	100	ug/L	1	-	U	Yes
Ç11 - C22 Aromatics	100	ug/L	1	-	UJ	Yes 🟏

Sample ID: MC49129-13

Sample location: BMSMC Building 5 Area

Sampling date: 12/12/2016
Matrix: Groundwater

METHOD: MADEP EPH

Analyte Name	Result	Units D	Dilution Factor	Lab Flag	Validation	Reportable
Ç11 - C22 Aromatics (Unadj.)	100	ug/L	1	-	UJ	Yes 🖊
Ç9 - C18 Aliphatics	84.9	ug/L	1	L	J	Yes
Ç19 - C36 Aliphatics	98.8	ug/L	1	J	J	Yes
Ç11 - C22 Aromatics	100	ug/L	1	-	UJ	Yes

Sample ID: MC49129-14

Sample location: BMSMC Building 5 Area

Sampling date: 12/12/2016

Matrix: AQ -Field Blank Water

Analyte Name	Result	Units D	ilution Factor	Lab Flag	Validation	Reportable
Ç11 - C22 Aromatics (Unadj.)	110	ug/L	1	-	UJ	Yes
Ç9 - C18 Aliphatics	110	ug/L	1	-	U	Yes
Ç19 - C36 Aliphatics	110	ug/L	1	-	U	Yes
Ç11 - C22 Aromatics	110	ug/L	1	-	UJ	Yes V/

Sample location: BMSMC Building 5 Area

Sampling date: 12/12/2016 Matrix: Groundwater METHOD: MADEP EPH

Analyte Name	Result	Units D	Dilution Factor	Lab Flag	Validation	Reportable
Ç11 - C22 Aromatics (Unadj.)	100	ug/L	1	-	UJ	Yes 🖊
Ç9 - C18 Aliphatics	19.6	ug/l.	1	J	J	Yes
Ç19 - C36 Aliphatics	100	ug/L	1	0_0	U	Yes
Ç11 - C22 Aromatics	100	ug/L	1		UJ	Yes

Sample ID: MC49129-16

Sample location: BMSMC Building 5 Area

Sampling date: 12/12/2016 Matrix: Groundwater METHOD: MADEP EPH

Analyte Name	Result	Units D	ilution Factor	Lab Flag	Validation	Reportable
Ç11 - C22 Aromatics (Unadj.)	110	ug/L	1	-	UJ	Yes V/
Ç9 - C18 Aliphatics	110	ug/L	1	-	-	Yes
Ç19 - C36 Aliphatics	64.1	ug/L	1	J	J	Yes
Ç11 - C22 Aromatics	110	ug/L	1	-	UJ	Yes 🗸

Sample ID: MC49129-17

Sample location: BMSMC Building 5 Area

Sampling date: 12/12/2016

Matrix: AQ -Field Blank Water

Analyte Name	Result	Units Di	lution Factor	Lab Flag	Validation	Reportable
Ç11 - C22 Aromatics (Unadj.)	110	ug/L	1	-	UJ	Yes 🗸
Ç9 - C18 Aliphatics	110	ug/L	1	-	U	Yes
Ç19 - C36 Aliphatics	110	ug/L	1	-	U	Yes
Ç11 - C22 Aromatics	110	ug/L	1	-	UJ	Yes V/

Sample ID: MC49129-12MS

Sample location: BMSMC Building 5 Area

Sampling date: 12/12/2016 Matrix: Groundwater

METHOD: MADEP EPH

Analyte Name	Result	Units I	Dilution Factor	Lab Flag	Validation	Reportable
Ç11 - C22 Aromatics (Unadj.)	533	ug/L	1	2	J	Yes
Ç9 - C18 Aliphatics	168	ug/L	1	-	•	Yes
Ç19 - C36 Aliphatics	315	ug/L	1	-	-	Yes

Sample ID: MC49129-12MSD

Sample location: BMSMC Building 5 Area

Sampling date: 12/12/2016 Matrix: Groundwater

METHOD: MADEP EPH

Analyte Name	Result	Units Di	lution Factor	Lab Flag	Validation	Reportable
Ç11 - C22 Aromatics (Unadj.)	589	ug/L	1	-		Yes
Ç9 - C18 Aliphatics	190	ug/L	1	-	-	Yes
Ç19 - C36 Aliphatics	338	ug/L	1	5.75	-	Yes

DATA REVIEW WORKSHEETS

Type of validation	n Full:X Limited:	Project Number:_MC49129
REVIEW OF	EXTRACTABLE PET	ROLEUM HYDROCARBON (EPHs) PACKAGE
validation actions. more informed de were assessed ac precedence MET HYDROCARBONS (2004). Also the c Support Section. T	This document will assistant and in better set occording to the data validation FOR THE DES (VPH), Massachusetts general validation guide the QC criteria and data	volatile organics were created to delineate required ist the reviewer in using professional judgment to make ving the needs of the data users. The sample results lidation guidance documents in the following order of TERMINATION OF EXTRACTABLE PETROLEUM is Department of Environmental Protection, Revision 1.1 elines promulgated by the USEPA Hazardous Wastes a validation actions listed on the data review worksheets unless otherwise noted.
	reviewed and the quali	ccutest_Laboratories data package ty control and performance data summarized. The data
No. of Samples: Field blank No.: Equipment blank N	lo.: _MC49129-6;_MC4 	9129-10;_MC49129-17 9129-14
X Blanks X Surrogate	Times Tuning Standard Performance	X Laboratory Control SpikesX Field DuplicatesX CalibrationsX Compound IdentificationsX Compound QuantitationX Quantitation Limits ate
Overall _Extractable_Petro	bleum_Hydrocarbons_b	Comments: y_GC_by_Method_MADEP_EPH,_REV_1.1
Definition of Qualif		
J- Estimated U- Compound R- Rejected d UJ- Estimated	d not detected lata	
Reviewer:	lail mant	?

		net and/or see below
. DATA COMPLETNE A. Data Packag		
MISSING INFORMATION	DATE LAB. CONTACTED	DATE RECEIVED
3. Other		Discrepancies:
		0.0000000000000000000000000000000000000

All criteria were metX
Criteria were not met and/or see below

HOLDING TIMES

The objective of this parameter is to ascertain the validity of the results based on the holding time of the sample from time of collection to the time of extraction, and subsequently from the time of extraction to the time of analysis.

Complete table for all samples and note the analysis and/or preservation not within criteria

SAMPLE ID	DATE SAMPLED	DATE EXTRACTED	DATE ANALYZED	ACTION
Samples	extracted and an	alvzed within me	thod recommend	ed holding time
				January IIII

Criteria

Preservation:

Aqueous samples must be acidified to a pH of 2.0 or less at the time of collection.

Soil samples must be cooled at 4 ± 2 °C immediately after collection.

Holding times:

Samples must be extracted within 14 days of collection, and analyzed within 40 days of extraction.

Cooler temperatur	e (Criteria: 4 <u>+</u> 2 ºC):_	4.8°C	

Actions: Qualify positive results/nondetects as follows:

If holding times are exceeded, estimate positive results (J) and nondetects (UJ). If holding times are grossly exceeded, use professional judgment to qualify data. The data reviewer may choose to estimate positive results (J) and rejects nondetects (R). If samples were not at the proper temperature (> 10°C) or improperly preserved, use professional judgment to qualify the results.

	Criteri	All crite a were not met and/or	ria were met see belowX	
CALIBRATIONS VERIFIC	ATION			
Compliance requirement ensure that the instrum quantitative data.				
Date of initial calib	ration:12/06	5/16		
Dates of initial cali	Dates of initial calibration verification:12/06/16			
Instrument iD num	bers:GCD	E		
Matrix/Level:AQUEOUS/MEDIUM				
DATE LAB FILE ID#	ANALYTE	CRITERIA OUT RFs, %RSD, %D, r	SAMPLES AFFECTED	
Initial and conti	nuing calibration me	et method specific requ	uirements	

Criteria- ICAL

- Five point calibration curve.
- The percent relative standard deviation (%RSD) of the calibration factor must be
 equal to or less than 25% over the working range for the analyte of interest.
 When this condition is met, linearity through the origin may be assumed, and the
 average calibration factor is used in lieu of a calibration curve.
- A collective calibration factor must also be established for each hydrocarbon range of interest. Calculate the collective CFs for C9-C18 Aliphatic Hydrocarbons, C19-C36 Aliphatic Hydrocarbons, and C11-C22 Aromatic Hydrocarbons using the FID chromatogram. Tabulate the summation of the peak areas of all components in that fraction against the total concentration injected. The %RSD of the calibration factor must be equal to or less than 25% over the working range for the hydrocarbon range of interest.
 - o The area for the surrogates must be subtracted from the area summation of the range in which they elute.
 - The areas associated with naphthalene and 2-methylnaphthalene in the aliphatic range standard must be subtracted from the uncorrected collective C9-C18 Aliphatic Hydrocarbon range area prior to calculating the CF.

Criteria- CCAL

 At a minimum, the working calibration factor must be verified on each working day, after every 20 samples or every 24 hours (whichever is more frequent), and

- at the end of the analytical sequence by the injection of a mid-level continuing calibration standard to verify instrument performance and linearity.
- If the percent difference (%D) for any analyte varies from the predicted response by more than ±25%, a new five-point calibration must be performed for that analyte. Greater percent differences are permissible for n-nonane. If the %D for n-nonane is greater than 30, note the nonconformance in the case narrative. It should be noted that the %Ds are calculated when CFs are used for the initial calibration and percent drifts are calculated when calibration curves using linear regression are used for the initial calibration.

Actions:

If %RSD > 25% for target compounds or a correlation coefficient < 0.99, estimate positive results (J) and use professional judgment to qualify nondetects. If % D > 25% (> 30 for nonane), estimate positive results (J) and nondetects (UJ).

CALIBRATIONS VERIFICATION

Compliance requirements for satisfactory instrument calibration are established to ensure that the instrument is capable of producing and maintaining acceptable quantitative data.

Date of initial calibration:12/06/16
Dates of continuing calibration verification:12/27/16;_12/28/16
Dates of final calibration verification:_12/06/16;_12/27/16;_12/28/16
Instrument ID numbers: GCDE_
Matrix/Level:_SOIL/AQUEOUS/MEDIUM

DATE	LAB FILE ID#	ANALYTE	CRITERIA OUT RFs, %RSD, <u>%D</u> ,	SAMPLES AFFECTED	
-			<u> </u>		
Initial ar	Initial and continuing calibration meets method specific requirements except for the cases described in this document.				
12/27/16	cc908-50	C11-C22 Aromatics	99.1	MC49129-1 to -17;	
	ecc908-50	C11-C22 Aromatics	99.1	-12MS/-12MSD	

Note: Results qualified as estimated (J or UJ) in affected samples.

A separate worksheet should be filled for each initial curve

			Criteria were not	All criteria were metX_ met and/or see below
VA. BLANK	ANALYSIS R	ESULTS (Se	ctions 1 & 2)	
magnitude of oblanks associated problems with evaluated to discuss, or if the	contamination ated with the s any blanks e etermine whet problem is an must be run	problems. The amples, inclusives, all data her or not the isolated occurrence after sample	e criteria for evaluding trip, equipm a associated with ere is an inheren urrence not affects as suspected of	etermine the existence and uation of blanks apply only to the ent, and laboratory blanks. In the case must be carefully to variability in the data for the cting other data. A Laborator being highly contaminated to
List the contar separately.	mination in the	blanks belov	w. High and low	evels blanks must be treated
Laboratory bla	nks			
DATE ANALYZED	LAB ID	LEVEL/ MATRIX	COMPOUND	CONCENTRATION UNITS
METHOD B	LANKS MEET	THE METHO	DD SPECIFIC CR	ITERIA
Field/Trip/ <u>Equ</u>	<u>ipment</u>			
DATE ANALYZED	LAB ID	LEVEL/ MATRIX	COMPOUND	CONCENTRATION UNITS
_NO_TARGET _ANALYZED_I	_ANALYTES_ FOR_THIS_D/	DETECTED_ ATA_PACKA	_IN_THE_FIELD/ GE	EQUIPMENT_BLANK

All criteria were met>	<u></u>
Criteria were not met and/or see below	

V B. BLANK ANALYSIS RESULTS (Section 3)

Blank Actions

The ALs for samples which have been diluted should be corrected for the sample dilution factor and/or % moisture, where applicable. Peaks must not be detected above the Reporting Limit within the retention time window of any analyte of interest. The hydrocarbon ranges must not be detected at a concentration greater than 10% of the most stringent MCP cleanup standard. Specific actions area as follows:

If the concentration is < sample quantitation limit (SQL) and < AL, report the compound as not detected (U) at the SQL.

If the concentration is \geq SQL but < AL, report the compound as not detected (U) at the reported concentration.

If the concentration is > AL, report the concentration unqualified.

All criteria were metX	
Criteria were not met and/or see below	

SURROGATE SPIKE RECOVERIES

Laboratory performance of individual samples is established by evaluation of surrogate spike recoveries. All samples are spiked with surrogate compounds prior to sample analysis. The accuracy of the analysis is measured by the surrogate percent recovery. Since the effects of the sample matrix are frequently outside the control of the laboratory and may present relatively unique problems, the validation of data is frequently subjective and demands analytical experience and professional judgment.

List the percent recoveries (%Rs) which do not meet the criteria for surrogate recovery. Matrix: solid/aqueous

SAMPLE ID	SURROGATE COMPOUND				ACTION
	S1	S2	S3	S4	
					Y_CONTROL ENT

Note: 1-chlorooctadecane recovered outside the laboratory control limits in samples MC49129-2; -4; -5 and -14. o-Terphenyl outside control limit in sample MC491-5. Outside control limits due to possible matrix interference. Confirmed by refractionation/reanalysis. No action taken.

It is recommended that surrogate standard recoveries be monitored and documented on a continuing basis. At a minimum, when surrogate recovery from a sample, blank, or QC sample is less than 40% or more than 140%, check calculations to locate possible errors, check the fortifying standard solution for degradation, and check changes in instrument performance.

If the cause cannot be determined, reanalyze the sample unless one of the following exceptions applies:

- (1) Obvious interference is present on the chromatogram (e.g., unresolved complex mixture);
- (2) The surrogate exhibits high recovery and associated target analytes or hydrocarbon ranges are not detected in sample.

If a sample with a surrogate recovery outside of the acceptable range is not reanalyzed based on any of these aforementioned exceptions, this information must be noted on the data report form and discussed in the Executive Report. Analysis of the sample on dilution may diminish matrix-related surrogate recovery problems. This approach can be used as long as the reporting limits to evaluate applicable MCP standards can still be achieved with the dilution. If not, reanalysis without dilution must be performed.

	All criteria were met _X
Criteria were not	met and/or see below

VII. A MATRIX SPIKE/MATRIX SPIKE DUPLICATE (MS/MSD)

This data is generated to determine long term precision and accuracy in the analytical method for various matrices. This data alone cannot be used to evaluate the precision and accuracy of individual samples.

At the request of the data user, and in consideration of sample matrices and data quality objectives, matrix spikes and matrix duplicates may be analyzed with every batch of 20 samples or less per matrix.

- Matrix duplicate Matrix duplicates are prepared by analyzing one sample in duplicate. The purpose of the matrix duplicates is to determine the homogeneity of the sample matrix as well as analytical precision. The RPD of detected results in the matrix duplicate samples must not exceed 50 when the results are greater than 5x the reporting limit.
- The desired spiking level is 50% of the highest calibration standard. However, the total concentration in the MS (including the MS and native concentration in the unspiked sample) should not exceed 75% of the highest calibration standard in order for a proper evaluation to be performed. The purpose of the matrix spike is to determine whether the sample matrix contributes bias to the analytical results. The corrected concentrations of each analyte within the matrix spiking solution must be within 40 140% of the true value. Lower recoveries of n-nonane are permissible but must be noted in the narrative if <30%.</p>

MS/MSD Recov	eries and Precision Crit	eria			
Sample ID:_MC	49129-12_MS/MSD		Matrix	/Level:Groun	dwater
List the %Rs, R	PD of the compounds w	hich do not	meet t	he QC criteria.	
MS OR MSD	COMPOUND	% R	RPD	QC LIMITS	ACTION
-					
	WW.0.5C				
	_				

Note: MS/MSD and RPD within laboratory control limits.

9

	All criteria were met	_X
Criteria were not	met and/or see below	

No action is taken on MS/MSD results alone to qualify the entire case. However, used informed professional judgment, the data reviewer may use the MS/MSD results in conjunction with other QC criteria and determine the need for some qualification of the data. In those instances where it can be determined that the results of the MS/MSD affect only the sample spiked, the qualification should be limited to this sample alone. However, it may be determined through the MS/MSD results that the laboratory is having a systematic problem in the analysis of one or more analytes, which affects the associated samples.

2. MS/MSD – Unspiked Compounds

List the concentrations of the unspiked compounds and determine the % RSDs of these compounds in the unspiked sample, matrix spike, and matrix spike duplicate.

COMPOUND	CONCENTRATI SAMPLE	ON MS	MSD	%RPD	ACTION
<u> </u>			<u> </u>		

Criteria: None specified, use %RSD ≤ 50 as professional judgment.

Actions:

If the % RSD > 50, qualify the results in the spiked sample as estimate (J). If the % RSD is not calculable (NC) due to nondetect value in the sample, MS, and/or MSD, use professional judgment to qualify sample data.

A separate worksheet should be used for each MS/MSD pair.

			Criteria		riteria were metX and/or see below
	VIII.	LABORATORY CON	TROL SAMPL	E (LCS/LCSD)	ANALYSIS
matric		ata is generated to de	termine accura	cy of the analy	tical method for various
	1.	LCS Recoveries Crite	eria		
		List the %R of compo	ounds which do	not meet the	criteria
LCS I)	COMPOUND	% R	QC LIMIT	ACTION
		RECOVERY_WITHIN B_DESCRIBED_IN_TI			_LIMTS_EXCET_FOR_
	Note:	C9-C18 - the recover No action taken, profes		as <30% for the	e laboratory control simple.
	Criteria *		ecific criteria		
	 * Refer to QAPP for specific criteria. * The spike recovery must be between 40% and 140%. Lower recoveries of n-nonane are permissible. If the recovery of n-nonane is <30%, note the nonconformance in the executive narrative. RPD between LCS/LCSD must be < 25%. 				
	Actions: Actions on LCS recovery should be based on both the number of compounds that are outside the %R and RPD criteria and the magnitude of the excedance of the criteria.				
		he analyte is > UL, զւ d samples and accept		e results (j) fo	r the affected analyte in
If the	%R of t		ualify all positiv	e results (j) ar	nd reject (R) nondetects
If more	e than h	alf the compounds in itive results as (J) and	the LCS are no		equired recovery criteria, I target analyte(s) in the
2.	Freque	ency Criteria:			
per ma If no, the eff	Where LCS analyzed at the required frequency and for each matrix (1 per 20 samples per matrix)? Yes or No. If no, the data may be affected. Use professional judgment to determine the severity of the effect and qualify data accordingly. Discuss any actions below and list the samples affected. Discuss the actions below:				

IX. FIELD/LAE	BORATOR'	Crite Y DUPLICATE PR	eria were not met and		netN/A below
Sample IDs:			Matrix:		
Field/laboratory duplicates samples may be taken and analyzed as an indication of overall precision. These analyses measure both field and lab precision; therefore, the results may have more variability than laboratory duplicates which measures only laboratory performance. It is also expected that soil duplicate results will have a greater variance than water matrices due to difficulties associated with collecting identical field duplicate samples.					
COMPOUND	SQL	SAMPLE CONC.	DUPLICATE CONC.	RPD	ACTION
			data package. MS/M ry and generally acce		
RPD + 30% for aq	ueous sam	ples, RPD <u>+</u> 50 %	ct-specific informatio for solid samples if r RPD criteria is double	esults a	are ≥ SQL.
SQL = soil quantita	ation limit				
Actions:					
If both the samp calculable (NC). N			s are nondetects (N	D), the	RPD is not
Qualify as estimated positive results (J) and nondetects (UJ) for the compound that exceeded the above criteria.					
If one sample resu	It is not de	tected and the oth	er is ≥ 5x the SQL qu	alify (J/	UJ).

Note: If SQLs for the sample and duplicate are significantly different, use professional

If one sample value is not detected and the other is < 5x the SQL, use professional

judgment to determine if qualification is appropriate.

judgment to determine if qualification is appropriate.

All criteria were metX_	
Criteria were not met and/or see below	

XI. COMPOUND IDENTIFICATION

The compound identification evaluation is to verify that the laboratory correctly identified target analytes as well as tentatively identified compounds (TICs).

- 1. Verify that the target analytes were within the retention time windows.
 - o Retention time windows must be re-established for each Target EPH Analyte each time a new GC column is installed, and must be verified and/or adjusted on a daily basis.
 - o The n-nonane (n-C9) peak must be adequately resolved from the solvent front of the chromatographic run.
 - o All surrogates must be adequately resolved from the Aliphatic Hydrocarbon and Aromatic Hydrocarbon standards.
 - For the purposes of this method, adequate resolution is assumed to be achieved if the height of the valley between two peaks is less than 25% of the average height of the two peaks.
 - The n-pentane (C5) and MtBE peaks must be adequately resolved from any solvent front that may be present on the FID and PID chromatograms, respectively.
- 1a. Aliphatic hydrocarbons range:
 - o Determine the total area count for all peaks eluting 0.1 minutes before the retention time (Rt) for n-C9 and 0.01 minutes before the Rt for n-C19.
 - o Determine the total area count for all peaks eluting 0.01 minutes before the Rt for n-C19 and 0.1 minutes after the Rt for n-C36.

Are the aliphatic hydrocarbons range properly determined?

Yes? or No?

Comments:

- 1b. Aromatic hydrocarbons range:
 - Determine the total area count for all peaks eluting 0.1 minutes before the retention time (Rt) for naphthalene and 0.1 minutes after the Rt for benzo(g,h,i)perylene.
 - Determine the peak area count for the sample surrogate (OTP) and fractionation surrogate(s). Subtract these values from the collective area count value.

Are the aliphatic hydrocarbons range properly determined?

Yes? or No?

Comments:

All criteria were met _	_X
Criteria were not met and/or see below	

- 2. If target analytes and/or TICs were not correctly identified, request that the laboratory resubmit the corrected data.
- 3. Breakthrough determination Each sample (field and QC sample) must be evaluated for potential breakthrough on a sample specific basis by evaluating the % recovery of the fractionation surrogate (2-bromonaphthalene) and on a batch basis by quantifying naphthalene and 2-methylnaphthalene in both the aliphatic and aromatic fractions of the LCS and LCSD. If either the concentration of naphthalene or 2-methylnaphthalene in the aliphatic fraction exceeds 5% of the total concentration for naphthalene or 2-methylnaphthalene in the LCS or LCSD, fractionation must be repeated on all archived batch extracts.

NOTE:

The total concentration of naphthalene or 2-methylnaphthalene in the LCS/LCSD pair includes the summation of the concentration detected in the aliphatic fraction and the concentration detected in the aromatic fraction.

Comments:Concentration_in_the_aliphatic_fraction_<_5%_of_the_total
_concentration_for_naphthalene_and_2-methylnaphthalene
A

4. Fractionation Check Standard — A fractionation check solution is prepared containing 14 alkanes and 17 PAHs at a nominal concentration of 200 ng/µl of each constituent. The Fractionation Check Solution must be used to evaluate the fractionation efficiency of each new lot of silica gel/cartridges, and establish the optimum hexane volume required to efficiently elute aliphatic hydrocarbons while not allowing significant aromatic hydrocarbon breakthrough. For each analyte contained in the fractionation check solution, excluding n-nonane, the Percent Recovery must be between 40 and 140%. A 30% Recovery is acceptable for n-nonane.

Is a fractionation check standard analyzed?

Yes? or No?

Comments: Not applicable.

All criteria were metX	
Criteria were not met and/or see below	

XII. QUANTITATION LIMITS AND SAMPLE RESULTS

The sample quantitation evaluation is to verify laboratory quantitation results.

In order to demonstrate the absence of aliphatic mass discrimination, the response ratio of C28 to C20 must be at least 0.85. If <0.85, this nonconformance must be noted in the laboratory case narrative.

The chromatograms of Continuing Calibration Standards for aromatics must be reviewed to ensure that there are no obvious signs of mass discrimination.

Is aliphatic mass discrimination observed in the sample?

Yes? or No?

Is aromatic mass discrimination observed in the sample?

Yes? or No?

1. In the space below, please show a minimum of one sample calculation:

MC49129-1

RF = 99940

[] = (3738095)/(99940)

RF = 67800

[] = (829643)/(67800)

DATA REVIEW WORKSHEETS

- 2. If requested, verify that the results were above the laboratory method detection limit (MDLs).
- 3. If dilutions performed, were the SQLs elevated accordingly by the laboratory? List the affected samples and dilution factor in the table below.

SAMPLE ID	DILUTION FACTOR	REASON FOR DILUTION		
		1		
		+		
		-		
		+		

If dilution was not performed, affected samples/compounds:	(J) for the	affected	compounds.	List the